

IBM Mobile Systems

S84H-8101-00

**Hardware Maintenance Manual
ThinkPad 365X, 365XD, 560**

February 1997

**We Want Your Comments!
(Please see page 205)**

This Manual Supports:

ThinkPad 365X	(2625)
ThinkPad 365XD	(2625)
ThinkPad 560	(2640)

IBM Mobile Systems

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IBM

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 210.

First Edition (February 1997)

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About This Manual

This manual contains service and reference information for IBM ThinkPad 365X, 365XD, and 560 products. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively.

The manual is divided into sections as follows:

The Introduction section provides general information, guidelines, and safety information required to service computers.

The product-specific sections include service, reference, and product-specific parts information.

The Common Devices Checkout section provides procedures for testing the devices that are commonly attached to ThinkPad computers.

The Miscellaneous Information section contains information about acronyms, abbreviations, terms, and a telephone number listing.

Important

This manual is intended for trained servicers who are familiar with ThinkPad products. Use this manual along with the advanced diagnostic tests to troubleshoot problems effectively.

Before servicing an IBM ThinkPad product, be sure to review the safety information under "Safety Notices (Multi-lingual Translations)" on page 8 and "Safety Information" on page 15.

Related Publications

The following product publications are available through IBM or your IBM Authorized Dealer.

Publication	Part, Form Number
Mobile Systems HMM Volume 1: Laptop, Notebook, Portable, and ThinkPad Computers (Models L40, CL57, N45, N51, P70/P75, ThinkPad 300, 350, 500, 510, 710T, Expansion Unit, Dock I, Dock II)	30H2356, S82G-1501-01
Mobile Systems HMM Volume 2: ThinkPad Computers (Models 340, 355, 360, 370, 700, 701, 720, 750, 755)	30H2357, S82G-1502-03
Mobile Systems HMM Volume 3: ThinkPad Computers (Models 365, 560, 760, SelectaDock)	78H6675, S82G-1503-04
ThinkPad 700 (9552) HMS	42G2016, S42G-2016
ThinkPad 700 (9552) HMR	42G2015, S42G-2015
ThinkPad 700C (9552) HMS	42G2022, S42G-2022
ThinkPad 700C (9552) HMR	42G2021, S42G-2021
ThinkPad 720/720C (9552) HMS	61G1193, S61G-1193
ThinkPad 720/720C (9552) HMR	61G1187, S61G-1187
ThinkPad 730T (2524) HMM	82G5497, S82G-5497
ThinkPad Exp. Crtg. (3550) HMS	42G2338, S42G-2338
ThinkPad Exp. Crtg. (3550) HMR	42G2339, S42G-2339
PS/2 FaxConcentrator HMS	15F2262, S15F-2262
PS/2 FaxConcentrator HMR	84F8541, S84F-8541
PS/2 Comm. Cartridge I HMS	10G5993, S10G-5993
PS/2 Comm. Cartridge I HMR	10G5992, S10G-5992
IBM High Speed Internal, PCMCIA Data/Fax Modems	61G1556, S61G-1556

Related Diskettes

The following diskettes are available through IBM or your IBM Authorized Dealer.

Diskette	Part, Form Number
ThinkPad 300 (2615) Advanced Diagnostics Diskette	33G9361, S33G-9361
ThinkPad 350, 350C, 425, 425C (2618) Advanced Diagnostics Diskette	A211000, GA21-1000
ThinkPad 365 (2625) Advanced Diagnostics Diskette	76H7578, S30H-2498
ThinkPad 500 (2603) Advanced Diagnostics Diskette	71G3702, S71G-3702
ThinkPad 510 (2604) Advanced Diagnostics Diskette	83G8095, S83G-8095
ThinkPad 700 (9552) Reference Diskette	42G2017, S42G-2017
ThinkPad 700C (9552) Reference Diskette	42G2023, S42G-2023
ThinkPad 720/720C (9552) Reference Diskette	61G1194, S61G-1194
ThinkPad Hardware Maintenance Diskette (for all Models 355, 360, 560, 750, 755, 760)	78H5384, S78H-5384
ThinkPad Dock I (3545)	71G4140, S71G-4140
Docking Station (3550)	42G2428, S42G-2428
Data/Fax Modem	61G1556, S61G-1556
FaxConcentrator/A	84F8540, S84F-8540

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Portable Computer Descriptions

Models N51, CL57, and P70/75 and Thinkpads 700x and 720x are Micro Channel systems. All others are AT/ISA bus systems.

Model	Type	Processor	Memory	Hrd Dsk
Model L40SX	8543-044	386SX-20	2M/18M	60M
Model N45 SL	2614-065	386SL-25	2M/8M	80M
	2614-067	386SL-25	2M/8M	120M
Model N51 SLC	8551-025	386SLC-16	2M/10M	80M
Model N51 SX	8551-033	386SX-16	2M/10M	40M
Model CL57 SX	8554-045	386SX-20	2M/16M	80M
Model P70 386	8573-031	80386-16	2M/8M	30M
	8573-061	80386-20	2M/8M	60M
	8573-121	80386-20	2M/8M	120M
Model P75 486	8573-161	80486-33	8M/16M	160M
	8573-401	80486-33	8M/16M	400M
ThinkPad 300	2615-065	386SL-25	4M/12M	80M
	2615-067	386SL-25	4M/12M	120M
ThinkPad 340	2610	486SLC2-50/25	4M/12M	125M
ThinkPad 340CSE	2610	486SLC2-50/25	4M/12M	200M
ThinkPad 340CSE	2610	486SLC2-66/33	4M/12M	360M
ThinkPad 345	2610	486DX4-75	4M/20M	360M
ThinkPad 345CS	2610	DX4-75	4M/20M	540M
ThinkPad 350	2618-AOE	486SL-25	4M/20M	85M
	2618-JOA	486SL-25	4M/20M	125M
	2618-LOA	486SL-25	4M/20M	250M
ThinkPad 350C	2618-NOA	486SL-25	4M/20M	125M
	2618-POA	486SL-25	4M/20M	250M
ThinkPad 355	2619	486SX-33	4M/16M	125M
ThinkPad 355C	2619	486SX-33	4M/16M	125M
	2619	486SX-33	4M/16M	250M
ThinkPad 355Cs	2619	486SX-33	2M/16M	170M
	2619	486SX-33	2M/16M	250M
ThinkPad 360	2620	486SX-33	4M/16M	170M
	2620	486SX-33	4M/16M	340M
ThinkPad 360C	2620	486SX-33	4M/16M	170M
	2620	486SX-33	4M/16M	340M
ThinkPad 360Cs	2620	486SX-33	4M/16M	170M
	2620	486SX-33	4M/16M	340M
ThinkPad 360Ce	2620	486DX2-50/25	4M/16M	170M
	2620	486DX2-50/25	4M/16M	340M
	2620	486DX2-50/25	4M/16M	540M
ThinkPad 360Cse	2620	486DX2-50/25	4M/16M	170M
	2620	486DX2-50/25	4M/16M	340M
	2620	486DX2-50/25	4M/16M	540M
ThinkPad 360P	2620	486SX-33	4M/16M	170M
	2620	486SX-33	4M/16M	340M
ThinkPad 365C	2625-205	486DX4-75	8M/24M	340M
	2625-x05	486DX4-75	8M/24M	540M
ThinkPad 365E	2625	5x86-100/33	8M/24M	540M
ThinkPad 365ED	2625	5x86-100/33	8M/24M	540M
ThinkPad 365X/XD	2625	Pentium-100	8M/24M	540M
	2625	Pentium-100	8M/24M	810M
	2625	Pentium-100	8M/24M	1.0G
ThinkPad 365X/XD	2625	Pentium-120	8M/24M	540M
	2625	Pentium-120	8M/24M	810M
	2625	Pentium-120	8M/24M	1.0G
ThinkPad 365X/XD	2625	Pentium-133	8M/40M	810M
	2625	Pentium-133	8M/40M	1.0G
	2625	Pentium-133	8M/40M	1.3G
ThinkPad 370C	9545	486DX4-75/25	4M/32M	340M
	9545	486DX4-75/25	4M/32M	540M
	9545	486DX4-75/33	4M/32M	810M

C Color
M Megabyte
P Pen
T Tablet
TPF ThinkPad File

Model	Type	Processor	Memory	Hrd Dsk
ThinkPad 500	2603-081	486SLC2-50/25	4M/12M	80M
	2603-171	486SLC2-50/25	4M/12M	170M
ThinkPad 560	2630	Pentium-100	8M/40M	540M
	2630	Pentium-100	8M/40M	810M
	2630	Pentium-100	8M/40M	1.0G
ThinkPad 560	2630	Pentium-120	8M/40M	540M
	2630	Pentium-120	8M/40M	810M
	2630	Pentium-120	8M/40M	1.0G
ThinkPad 560	2640	Pentium-130	8M/40M	540M
	2640	Pentium-130	8M/40M	810M
	2640	Pentium-130	8M/40M	1.0G
ThinkPad 700	9552-300	486SLC-25	4M/16M	80M
	9552-301	486SLC-25	4M/16M	120M
ThinkPad 700C	9552-30B	486SLC-25	4M/16M	120M
ThinkPad 701C	2630	486DX2-25/50	4M/32M	360MB
	2630	486DX2-25/50	4M/32M	540MB
	2630	486DX4-25/75	8M/32M	360MB
	2630	486DX4-25/75	8M/32M	540MB
ThinkPad 701Cs	2630	486DX2-25/50	4M/32M	360MB
	2630	486DX2-25/50	4M/32M	540MB
	2630	486DX4-25/75	8M/32M	360MB
	2630	486DX4-25/75	8M/32M	540MB
ThinkPad 710T	2523-09Y	486SLC2-25	4M/12M	TPF
	2523-302	486SLC2-25	4M/12M	60M
	2523-303	486SLC2-25	4M/12M	60M
	2523-303	486SLC2-25	4M/12M	60M
ThinkPad 720	9552-307	486SLC-25/50	4M/16M	120M
	9552-308	486SLC-25/50	4M/16M	160M
ThinkPad 720C	9552-30J	486SLC-25/50	4M/16M	160M
ThinkPad 730T	2524	486SLC2-25	4M/12M	0M
	2524	486SLC2-25	4M/12M	60M
ThinkPad 750	9545-006	486SL-33	4M/20M	170M
	9545-008	486SL-33	4M/20M	340M
ThinkPad 750C	9545-306	486SL-33	4M/20M	170M
	9545-308	486SL-33	4M/20M	340M
ThinkPad 750Ce	9545	P24S-50/25	4M/20M	340M
ThinkPad 750Cs	9545	486SL-33	4M/20M	170M
	9545	486SL-33	4M/20M	340M
ThinkPad 750P	9545-40C	486SL-33	4M/20M	170M
	9545-40E	486SL-33	4M/20M	340M
ThinkPad 755C	9545	486DX4-50/25	4M/32M	170M
	9545	486DX4-50/25	4M/32M	340M
	9545	486DX4-50/25	4M/32M	540M
	9545	486DX4-75/25	4M/32M	170M
	9545	486DX4-75/25	4M/32M	340M
	9545	486DX4-75/25	4M/32M	540M
ThinkPad 755CD	9545	486DX4-100/33	8M/32M	540M
	9545	486DX4-100/33	8M/32M	810M
ThinkPad 755CDV	9545	486DX4-100/33	8M/32M	540M
	9545	486DX4-100/33	8M/32M	810M
ThinkPad 755Ce	9545	486DX4-100/33	8M/32M	340M
	9545	486DX4-100/33	8M/32M	540M
	9545	486DX4-100/33	8M/32M	810M
	9545	486DX4-100/33	8M/32M	810M
ThinkPad 755Cs	9545	486DX4-50/25	8M/32M	170M
	9545	486DX4-50/25	8M/32M	340M
	9545	486DX4-50/25	8M/32M	540M
	9545	486DX4-75/25	8M/32M	170M
	9545	486DX4-75/25	8M/32M	340M
	9545	486DX4-75/25	8M/32M	540M
ThinkPad 755Cse	9545	486DX4-100/33	8M/32M	340M
	9545	486DX4-100/33	8M/32M	540M
ThinkPad 755CV	9545	486DX4-100/33	8M/32M	540M
	9545	486DX4-100/33	8M/32M	810M
ThinkPad 755CV	9545	486DX4-100/33	8M/32M	540M
	9545	486DX4-100/33	8M/32M	810M

C Color
M Megabyte
P Pen
T Tablet
TPF ThinkPad File

Model	Type	Processor	Memory	Hrd Dsk
ThinkPad 760C/CD	9546	Pentium-90	8M/40M	360M
	9546	Pentium-120	8M/40M	720M
	9546	Pentium-90	8M/40M	810M
	9546	Pentium-120	8M/40M	1.2G
ThinkPad 760E/ED	9546	Pentium-120	8M/80M	810M
	9546	Pentium-133	8M/80M	1.0G
	9546	Pentium-150	8M/80M	1.2G
	9546	Pentium-166	8M/80M	1.3G
	9546	Pentium-166	8M/80M	2.1G
ThinkPad 760EL/ELD	9547	Pentium-100	8M/80M	810M
	9547	Pentium-100	8M/80M	1.0G
	9547	Pentium-100	8M/80M	1.2G
	9547	Pentium-120	8M/80M	810M
	9547	Pentium-120	8M/80M	1.0G
	9547	Pentium-120	8M/80M	1.2G
	9547	Pentium-133	8M/80M	810M
	9547	Pentium-133	8M/80M	1.0G
	9547	Pentium-133	8M/80M	1.2G
ThinkPad 760L/LD	9546	Pentium-90	8M/40M	810M
	9546	Pentium-90	8M/40M	1.1G
	9546	Pentium-90	8M/40M	1.2G
	9546	Pentium-120	8M/40M	810M
	9546	Pentium-120	8M/40M	1.1G
	9546	Pentium-120	8M/40M	1.2G

C	Color	T	Tablet
M	Megabyte	TPF	ThinkPad File
P	Pen		

Drive and Diskette Compatibility Matrix

The following table provides identification information for 3.5-inch drives.

Diskette Drive	Identifying Mark
3.5-Inch - 1.44MB	1.44 on the eject button
3.5-Inch - 2.88MB	2.88 on the eject button

The following table provides compatibility information for 3.5-inch diskettes and 3.5-inch diskette drives.

Diskette Capacity	1.44MB Drive	2.88MB Drive
1.0MB	Read/Write	Read/Write
2.0MB	Read/Write	Read/Write
4.0MB	Not Compatible	Read/Write

The following table provides identification information for 5.25-inch diskette drives.

Diskette Drive	Identifying Mark
5.25-Inch - 360KB (External)	Asterisk on bezel
5.25-Inch - 1.2MB (Internal)	1.2 on the eject button

The following table provides compatibility information for 5.25-inch diskettes and 5.25-inch diskette drives.

Diskette Capacity	360KB Drive	1.2MB Drive
360KB	Read/Write	Read/Write
1.2MB	Not Compatible	Read/Write

Note: A 360KB diskette written to or formatted on a 1.2MB drive can be read reliably only on a 1.2MB drive.

Important Service Information

Important

Diskette fixes are customer installable. The diskette fixes are located on the PC Company Bulletin Board Service (BBS). The direct phone line for modem connection is 919-557-0001 or tieline 255-0001.

Advise customers to contact the PC Company HelpCenter at 800-772-2227 if they need assistance in obtaining or installing any diskette fixes.

Customers in Canada should call IBM HelpPC at 800-565-3344 for assistance or down-load information. The Canadian BBS phone numbers are:

Montreal	514-938-3022
Toronto	905-316-4255
Vancouver	604-664-6464
Winnipeg	204-934-2735

FRU Replacement Strategy

Before Replacing Parts

Ensure that all diskette fixes are installed prior to replacing any FRUs listed in this manual.

Use the following strategy to prevent unnecessary FRU replacement and service expense:

If you are instructed to replace a FRU and that does not correct the problem, reinstall the original FRU before you continue.

Some computers have both a processor board and a system board. If you are instructed to replace either the processor board or the system board, and the first board that you replaced does not correct the problem, reinstall the original board, then replace the other (processor or system) board.

If an adapter or device consists of more than one FRU, an error code may be caused by any of the FRUs. Before replacing the adapter or device, remove the FRUs, one by one, to see if the symptoms change. Replace only the FRU that changed the symptoms.

Attention

A customized setup configuration (other than default settings) may exist on the computer you are servicing. Running Automatic Configuration may alter those settings. Note the current configuration settings (using the View Configuration option) and verify that the settings are in place when service is complete.

The advanced diagnostic tests are intended to test *only* IBM products. Non-IBM products or modified options can give false errors and invalid responses.

Hard Disk Drive Replacement Strategy:

Always try to run a low-level format before replacing a hard disk drive.

Attention

The drive startup sequence in the computer you are servicing might have been changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

How to Use Error Messages

Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. The cause of the first error code can result in false error codes being displayed. If no error code is displayed, see if the error symptom is listed in the Symptom-to-FRU Index for the computer you are servicing.

How to Read POST Error Messages

POST error messages are displayed on the screen as three, four, five, or eight digits. The error messages that can be displayed as shorter POST messages are highlighted in this index. Some digits will represent different information for SCSI errors versus non-SCSI errors.

The following example shows which digits display the shorter POST error messages and also defines the SCSI information in an eight-digit error message.

Shorter POST Messages

```
Reserved                Size (SCSI)
                        Slot Number (SCSI)
Device Code             Logical Unit Number (SCSI)
                        ID (SCSI)
```

All SCSI devices are set to a different SCSI ID. Duplicate SCSI ID settings can generate a false error message. Use the SCSI ID to determine whether the error message is coming from an internal or an external device.

Safety Notices (Multi-lingual Translations)

In this manual, safety notices appear in English with a page number reference to the appropriate multi-lingual, translated safety notice found in this section.

The following safety notices are provided in English, French, German, Italian, and Spanish languages.

Safety Notice 1

Before the computer is powered-on after FRU replacement, make sure all screws, springs, or other small parts are in place and are not left loose inside the computer. Verify this by shaking the computer and listening for rattling sounds. Metallic parts or metal flakes can cause electrical shorts.

Avant de remettre l'ordinateur sous tension après remplacement d'une unité en clientèle, vérifiez que tous les ressorts, vis et autres pièces sont bien en place et bien fixées. Pour ce faire, secouez l'unité et assurez-vous qu'aucun bruit suspect ne se produit. Des pièces métalliques ou des copeaux de métal pourraient causer un court-circuit.

Bevor nach einem FRU-Austausch der Computer wieder angeschlossen wird, muß sichergestellt werden, daß keine Schrauben, Federn oder andere Kleinteile fehlen oder im Gehäuse vergessen wurden. Der Computer muß geschüttelt und auf Klappergeräusche geprüft werden. Metallteile oder -splitter können Kurzschlüsse erzeugen.

Prima di accendere l'elaboratore dopo che é stata effettuata la sostituzione di una FRU, accertarsi che tutte le viti, le molle e tutte le altri parti di piccole dimensioni siano nella corretta posizione e non siano sparse all'interno dell'elaboratore. Verificare ciò scuotendo l'elaboratore e prestando attenzione ad eventuali rumori; eventuali parti o pezzetti metallici possono provocare cortocircuiti pericolosi.

Antes de encender el sistema despues de sustituir una FRU, compruebe que todos los tornillos, muelles y demás piezas pequeñas se encuentran en su sitio y no se encuentran sueltas dentro del sistema. Compruébelo agitando el sistema y escuchando los posibles ruidos que provocarían. Las piezas metálicas pueden causar cortocircuitos eléctricos.

Safety Notice 2

Some standby batteries contain a small amount of nickel and cadmium. Do not disassemble it, recharge it, throw it into fire or water, or short-circuit it. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

Certaines batteries de secours contiennent du nickel et du cadmium. Ne les démontez pas, ne les rechargez pas, ne les exposez ni au feu ni à l'eau. Ne les mettez pas en court-circuit. Pour les mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la pile de sauvegarde ou celle de l'horloge temps réel, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. Une batterie ou une pile inappropriée risque de prendre feu ou d'exploser.

Die Bereitschaftsbatterie, die sich unter dem Diskettenlaufwerk befindet, kann geringe Mengen Nickel und Cadmium enthalten. Sie darf nur durch die Verkaufsstelle oder den IBM Kundendienst ausgetauscht werden. Sie darf nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Die Batterie kann schwere Verbrennungen oder Verätzungen verursachen. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Bereitschafts- oder Systembatterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

Alcune batterie di riserva contengono una piccola quantità di nichel e cadmio. Non smontarle, ricaricarle, gettarle nel fuoco o nell'acqua né cortocircuitarle. Smaltirle secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria dell'RTC (real time clock) o la batteria di supporto, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Algunas baterías de reserva contienen una pequeña cantidad de níquel y cadmio. No las desmonte, ni recargue, ni las eche al fuego o al agua ni las cortocircuite. Deséchelas tal como dispone la normativa local. Utilice sólo baterías que se encuentren en la lista de piezas. La utilización de una batería no apropiada puede provocar la ignición o explosión de la misma.

Safety Notice 3

The battery pack contains small amounts of nickel. Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations. Use only the battery in the appropriate parts listing when replacing the battery pack. Use of an incorrect battery can result in ignition or explosion of the battery.

La batterie contient du nickel. Ne la démontez pas, ne l'exposez ni au feu ni à l'eau. Ne la mettez pas en court-circuit. Pour la mettre au rebut, conformez-vous à la réglementation en vigueur. Lorsque vous remplacez la batterie, veillez à n'utiliser que les modèles cités dans la liste de pièces détachées adéquate. En effet, une batterie inappropriée risque de prendre feu ou d'exploser.

Akkus enthalten geringe Mengen von Nickel. Sie dürfen nicht zerlegt, wiederaufgeladen, kurzgeschlossen, oder Feuer oder Wasser ausgesetzt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

La batteria contiene piccole quantità di nichel. Non smontarla, gettarla nel fuoco o nell'acqua né cortocircuitarla. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). Quando si sostituisce la batteria, utilizzare soltanto i tipi inseriti nell'appropriato Catalogo parti. L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

Las baterías contienen pequeñas cantidades de níquel. No las desmonte, ni recargue, ni las eche al fuego o al agua ni las cortocircuite. Deséchelas tal como dispone la normativa local. Utilice sólo baterías que se encuentren en la lista de piezas al sustituir la batería. La utilización de una batería no apropiada puede provocar la ignición o explosión de la misma.

Safety Notice 4

The lithium battery can cause a fire, explosion, or severe burn. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

La pile de sauvegarde contient du lithium. Elle présente des risques d'incendie, d'explosion ou de brûlures graves. Ne la rechargez pas, ne retirez pas son connecteur polarisé et ne la démontez pas. Ne l'exposez pas à une température supérieure à 100°C, ne la faites pas brûler et n'en exposez pas le contenu à l'eau. Mettez la pile au rebut conformément à la réglementation en vigueur. Une pile inappropriée risque de prendre feu ou d'exploser.

Die Systematterie ist eine Lithiumatterie. Sie kann sich entzünden, explodieren oder schwere Verbrennungen hervorrufen. Batterien dieses Typs dürfen nicht aufgeladen, zerlegt, über 100 C erhitzt oder verbrannt werden. Auch darf ihr Inhalt nicht mit Wasser in Verbindung gebracht oder der zur richtigen Polung angebrachte Verbindungsstecker entfernt werden. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Beim Ersetzen der Batterie nur Batterien des Typs verwenden, der in der Ersatzteilliste aufgeführt ist. Der Einsatz falscher Batterien kann zu Entzündung oder Explosion führen.

La batteria di supporto è una batteria al litio e può incendiarsi, esplodere o procurare gravi ustioni. Evitare di ricaricarla, smontarne il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Smaltirla secondo la normativa in vigore (DPR 915/82, successive disposizioni e disposizioni locali). L'impiego di una batteria non adatta potrebbe determinare l'incendio o l'esplosione della batteria stessa.

La batería de repuesto es una batería de litio y puede provocar incendios, explosiones o quemaduras graves. No la recargue, ni quite el conector polarizado, ni la desmonte, ni caliente por encima de los 100°C (212°F), ni la incinere ni exponga el contenido de sus celdas al agua. Deséchela tal como dispone la normativa local.

Safety Notice 5

If the LCD breaks and the fluid from inside the LCD gets into your eyes or on your hands, immediately wash the affected areas with water for at least 15 minutes. Seek medical care if any symptoms from the fluid are present after washing.

Si le panneau d'affichage à cristaux liquides se brise et que vous recevez dans les yeux ou sur les mains une partie du fluide, rincez-les abondamment pendant au moins quinze minutes. Consultez un médecin si des symptômes persistent après le lavage.

Die Leuchtstoffröhre im LCD-Bildschirm enthält Quecksilber. Bei der Entsorgung die örtlichen Bestimmungen für Sondermüll beachten. Der LCD-Bildschirm besteht aus Glas und kann zerbrechen, wenn er unsachgemäß behandelt wird oder der Computer auf den Boden fällt. Wenn der Bildschirm beschädigt ist und die darin befindliche Flüssigkeit in Kontakt mit Haut und Augen gerät, sollten die betroffenen Stellen mindestens 15 Minuten mit Wasser abgespült und bei Beschwerden anschließend ein Arzt aufgesucht werden.

Nel caso che caso l'LCD si dovesse rompere ed il liquido in esso contenuto entrasse in contatto con gli occhi o le mani, lavare immediatamente le parti interessate con acqua corrente per almeno 15 minuti; poi consultare un medico se i sintomi dovessero permanere.

Si la LCD se rompe y el fluido de su interior entra en contacto con sus ojos o sus manos, lave inmediatamente las áreas afectadas con agua durante 15 minutos como mínimo. Obtenga atención medica si se presenta algún síntoma del fluido despues de lavarse.

Safety Notice 6

To avoid shock, do not remove the plastic cover that surrounds the lower portion of the inverter card.

Afin d'éviter tout risque de choc électrique, ne retirez pas le cache en plastique protégeant la partie inférieure de la carte d'alimentation.

Aus Sicherheitsgründen die Kunststoffabdeckung, die den unteren Teil der Spannungswandlerplatine umgibt, nicht entfernen.

Per evitare scosse elettriche, non rimuovere la copertura in plastica che avvolge la parte inferiore della scheda invertitore.

Para evitar descargas, no quite la cubierta de plástico que rodea la parte baja de la tarjeta invertida.

Safety Notice 7

Though main batteries have low voltage, a shorted or grounded battery can produce enough current to burn combustible materials or personnel.

Bien que le voltage des batteries principales soit peu élevé, le court-circuit ou la mise à la masse d'une batterie peut produire suffisamment de courant pour brûler des matériaux combustibles ou causer des brûlures corporelles graves.

Obwohl Hauptbatterien eine niedrige Spannung haben, können sie doch bei Kurzschluß oder Erdung genug Strom abgeben, um brennbare Materialien zu entzünden oder Verletzungen bei Personen hervorzurufen.

Sebbene le batterie di alimentazione siano a basso voltaggio, una batteria in corto circuito o a massa può fornire corrente sufficiente da bruciare materiali combustibili o provocare ustioni ai tecnici di manutenzione.

Aunque las baterías principales tienen un voltaje bajo, una batería cortocircuitada o con contacto a tierra puede producir la corriente suficiente como para quemar material combustible o provocar quemaduras en el personal.

Safety Notice 8

Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, remove the battery pack, then disconnect any interconnecting cables.

Avant de retirer une unité remplaçable en clientèle, mettez le système hors tension, débranchez tous les cordons d'alimentation des socles de prise de courant, retirez la batterie et déconnectez tous les cordons d'interface.

Die Stromzufuhr muß abgeschaltet, alle Stromkabel aus der Steckdose gezogen, der Akku entfernt und alle Verbindungskabel abgenommen sein, bevor eine FRU entfernt wird.

Prima di rimuovere qualsiasi FRU, spegnere il sistema, scollegare dalle prese elettriche tutti i cavi di alimentazione, rimuovere la batteria e poi scollegare i cavi di interconnessione.

Antes de quitar una FRU, apague el sistema, desenchufe todos los cables de las tomas de corriente eléctrica, quite la batería y, a continuación, desconecte cualquier cable de conexión entre dispositivos.

Safety Information

The following section contains the safety information that you need to be familiar with before servicing an IBM mobile computer.

General Safety

Follow these rules to ensure general safety:

Observe good housekeeping in the area of the machines during and after maintenance.

When lifting any heavy object:

1. Ensure you can stand safely without slipping.
2. Distribute the weight of the object equally between your feet.
3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*

Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.

Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.

Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.

Keep your tool case away from walk areas so that other people will not trip over it.

Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.

Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.

Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Attention: Metal objects are good electrical conductors.

Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.

After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.

Reinstall all covers correctly before returning the machine to the customer.

Electrical Safety

Observe the following rules when working on electrical equipment.

Important

Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.

Do not work alone under hazardous conditions or near equipment that has hazardous voltages.

Disconnect all power before:

- Performing a mechanical inspection
- Working near power supplies
- Removing or installing main units

Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.

If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:

- Ensure that another person, familiar with the power-off controls, is near you.

Attention: Another person must be there to switch off the power, if necessary.

- Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

Attention: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.

- When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
- Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

Regularly inspect and maintain your electrical hand tools for safe operational condition.

Do not use worn or broken tools and testers.

Never assume that power has been disconnected from a circuit. First, *check* that it has been powered-off.

Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.

Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.

Do not service the following parts *with the power on* when they are removed from their normal operating places in a machine:

- Power supply units
- Pumps
- Blowers and fans
- Motor generators

and similar units. (This practice ensures correct grounding of the units.)

If an electrical accident occurs:

- **Use caution; do not become a victim yourself.**
- **Switch off power.**
- **Send another person to get medical aid.**

Safety Inspection Guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).

Explosive hazards, such as a damaged CRT face or bulging capacitor

Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling Electrostatic Discharge-Sensitive Devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

Keep the parts in protective packages until they are inserted into the product.

Avoid contact with other people.

Wear a grounded wrist strap against your skin to eliminate static on your body.

Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.

Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.

Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note

The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the AC plug on AC-operated computers.

Grounding Requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Laser Compliance Statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.

CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

O uso de controles, ajustes ou desempenho de procedimentos diferentes daqueles aqui especificados pode resultar em perigosa exposição à radiação.

凡未在这里指明的任何控制用法、调整、行为，都会导致严重后果。

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites.

Werden Steuer- und Einstellelemente anders als hier festgesetzt verwendet, kann gefährliche Laserstrahlung auftreten.

Az itt előírt eljárásoktól, beállításoktól és vezérlésektől eltérni a lézersugárzás veszélye miatt kockázatos !

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure diverse da quelle specificate possono provocare l'esposizione a

Использование элементов настройки и выполнение процедур иных, чем указано здесь, может привести к опасному радиационному облучению.

Použitie kontrôl, úprav alebo iných vykonaní od iných výrobcov, ako je v tomto špecifikované, mohlo by mať za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

El uso de controles o ajustes o la ejecución de procedimientos distintos de los aquí especificados

puede provocar la exposición a radiaciones peligrosas.

Opening the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

DANGER:

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Radiação por raio laser ao abrir. Não olhe fixo no feixe de luz, não olhe diretamente por meio de instrumentos óticos e evite exposição direta com o feixe de luz.

开启时会有激光发射时，请勿直视激光光束，请勿直接查看视觉仪器，并且避免直接接触在激光光束之中。

Rayonnement laser si carter ouvert. Évitez de fixer le faisceau, de le regarder directement avec des instruments optiques, ou de vous exposer au rayon.

Laserstrahlung bei geöffnetem Gerät. Nicht direkt oder über optische Instrumente in den Laserstrahl sehen und den Strahlungsbereich meiden.

Kinyitáskor lézersugár ! Ne nézzen bele se szabad szemmel, se optikai eszközökkel. Kerülje a sugárnyalábbal való érintkezést !

Aprindo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici e evitare l'esposizione diretta al fascio.

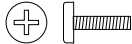







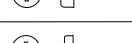



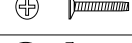
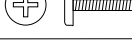

Открывая, берегитесь лазерного излучения. Не смотрите на луч, не разглядывайте его с помощью оптических инструментов, а также избегайте прямого воздействия лазерного луча.

Ked' je laserová jednotka otvorená. Vyhňte sa priamemu pohľadu a nehladte priamo s optickými nástrojmi do lúča a vyhňte sa priamemu vystaveniu lúčov.

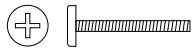



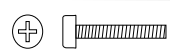





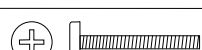
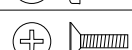
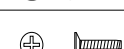


Radiación láser al abrir. No mire fijamente ni examine con instrumental óptico el haz de luz. Evite la exposición directa al haz.

Screw Size Chart



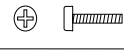



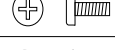
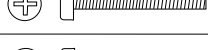
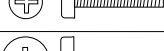





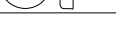
Use the chart below to match the size and shape of the screws used in the computer you are servicing.

A		Silver
B		Black
C		Silver
D		Brass
E		Black
F		Black
G		Black
H		Brass
J		Silver
K		Brass
L		Silver
M		Silver
N		Silver
P		Black
Q		Brass

Screw Size Chart (continued): Use the chart below to match the size and shape of the screws used in the computer you are servicing.

R		Brass
S		Black
T		Brass
U		Black
V		Brass
W		Black
X		Black
Y		Brass
Z		Brass
AA		Black
BB		Brass
CC		Brass
DD		Black
EE		Black
FF		Silver

Screw Size Chart (continued): Use the chart below to match the size and shape of the screws used in the computer you are servicing.

GG		Silver
HH		Brass
JJ		Silver
KK		Black
LL		Brass
MM		Brass
NN		Silver
PP		Brass
QQ		Brass
RR		Brass
SS		Brass
TT		Black
UU		Black
WW		Silver
XX		Black

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Read This First

Before you go to the checkout guide, be sure to read this section.

Important Notes

Only certified trained personnel should service the computer.

Read FRU service procedures before replacing any FRUs.

Be extremely careful during write operations such as copying, saving, or formatting. Drives in the computer that you are servicing might have been rearranged or the drive startup sequence might have been altered. If you select an incorrect drive, data or programs can be written over.

Replace FRUs only for the correct model.

When you replace the FRU, make sure the model of the machine and FRU part number are correct by referring to the parts list.

FRUs should not be replaced because of a single, un-reproducible failure. Single failures can occur from a variety of reasons that have nothing to do with a hardware defect such as: cosmic radiation, electrostatic discharge, or software errors. FRU replacement should only be considered when a recurring problem exists. If this is suspected, clear the error log and run the test again. Do not replace any FRUs if log errors do not reappear.

Be careful not to replace a non-defective FRU.

How to Use Error Messages: Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. The cause of the first error code can result in false error codes being displayed. If no error code is displayed, see if the error symptom is listed in the "Symptom-to-FRU Index" on page 40.

Port Replicator Problems: If you suspect a problem with the Port Replicator, see "Port Replicator Checkout" in the "Common Devices Checkout" section.

How to Diagnose Multiple FRUs: When the adapter or device has more than one FRU, the error code could be caused by either FRU. Before replacing multiple FRUs, try removing or exchanging each FRU, one by one in the designated sequence, to see if the symptoms change.

What to Do First: The servicer must include the following information on the parts exchange form or parts return form that is attached to the returned FRU:

- ___ 1. Name and phone number of servicer.
- ___ 2. Date of service.
- ___ 3. Date when part failed.
- ___ 4. Date of purchase.
- ___ 5. Failure symptoms, error codes appearing on display, and beep symptoms.
- ___ 6. Procedure index and page number in which failing FRU was detected.
- ___ 7. Failing FRU name and part number.
- ___ 8. Machine type, model number, and serial number.
- ___ 9. Customer's name and address.

Before checking problems with the computer, determine whether or not the damage is covered by the warranty by referring to the following:

Warranty Note

During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer. The following list provides some common items that are not covered under warranty and some symptoms that may indicate the system was subjected to stresses beyond normal use.

- LCD panel cracked by excessive force or being dropped.
- Scratched (cosmetic) parts.
- Cracked or broken plastic parts, broken latches, broken pins, or broken connectors caused by excessive force.
- Damage caused by liquid spilled into the system.
- Damage caused by improperly inserting a PCMCIA card or installation of an incompatible card.
- Damage caused by foreign material in the diskette drive slot.
- Diskette drive damage caused by pressing the diskette drive cover or inserting diskettes with multiple labels.
- Damaged or bent diskette eject button.
- CD-ROM drive damage caused by excessive force, shock, or from being dropped.
- Fuses blown by attaching a non-supported device.
- Forgotten computer or hard disk password (making computer or hard disk unusable).

If the following symptoms are present, they may indicate damage caused by non-warranted activity:

Missing parts may be a symptom of unauthorized service or modification.

HDD spindles can become noisy if subjected to excessive force or if the HDD is dropped.

I9990303 errors can be caused by exposure to strong magnetic fields.

How to Disable the Power-On Password:

1. Power off the computer.
2. Open the keyboard and lift the right-most section of the insulator sheet.
3. Push out the small door on the right side of the base cover. See page 100 for location.
4. Apply a short across the Power-On Password Jumper Pads.

Warning: When using a metal tool to short the two jumper pads, make sure the metal tool does not touch any metal parts other than the two jumper pads.

5. With the jumper tool in place, power on the computer to clear the password.
6. Remove the jumper and power off the computer.
7. Power on the computer and verify that the password has been cleared.

To reactivate the password, set the password again.

Supervisor and Hard Disk Passwords: The Supervisor Password and the Hard Disk Password (HDP) are security features that are used to protect the system and the hard disk data from unauthorized access. No overriding capability is provided. If only a hard disk password is set, obtaining permission from the password owner to unlock the password is a prerequisite for running diagnostic tests and performing service. If both supervisor password and hard disk password are set, you can enter Easy-Setup by pressing the **Enter** key or power-on password at the supervisor password prompt. In this case, the **Password**, **Start up**, and **Initialize** icons cannot be selected.

See "Password Combinations (POP, HDP, PAP)" on page 58 for more information about passwords.

Checkout Guide

Use the following procedure as a guide for computer problems.

Note

The diagnostic tests are intended to test only IBM products. Non-IBM products, prototype cards, or modified options can give false errors and invalid system responses.

1. Obtain the failing symptoms in as much detail as possible.
2. Verify the symptoms by attempting to recreate the failure by running the diagnostic test or by repeating the same operation.

Note

To run the diagnostics, refer to "How to Run the Diagnostics" on page 54.

3. Use the following table with the verified symptom to determine which page to go to. Search the symptoms column and find the description that best matches your symptom; then go to the page shown in the "Go to" column.

Symptoms (Verified)	Go to
Power failure. (The power indicator does not go on or stay on.)	"Power Systems Checkout" on page 34.
POST does not complete. No beeps or error codes are indicated.	"Symptom-to-FRU Index" on page 40, and then use the No-Beep Symptoms table.
POST beeps, but no error codes are displayed.	"Symptom-to-FRU Index" on page 40, and then use the Beep Symptoms table.
POST detected an error and displayed numeric error codes.	"Symptom-to-FRU Index" on page 40, and then use the Numeric Error Codes table.
The diagnostic test detected an error and displayed a FRU code.	"FRU Codes" on page 57.
The configuration is not the same as the installed devices.	"Checking the Installed Devices List" on page 57.

Symptoms (Verified)	Go to
Other symptoms (such as LCD display problems).	"Symptom-to-FRU Index" on page 40, and then use the Other Symptoms table.
Symptoms cannot be recreated. (Intermittent problems.)	Use the customer reported symptoms and go to "Symptom-to-FRU Index" on page 40.

Memory Checkout

DIMM cards are available for increasing memory capacity.

DIMM	Displayed Value
No DIMM installed	7808KB
8MB	16000KB
16MB	24192KB
32MB	40576KB

Memory errors might stop system operations, show error messages on the screen, or hang the system.

Use the following procedure to isolate memory problems.

Note

Make sure that the DIMM is fully installed into the connector. Both latches must be latched completely. A loose connection can cause error code 195.

1. Power off the computer and remove the DIMM from its slot (if installed).
2. Press and hold the F1 key; then power on the computer. Hold the F1 key down until the Easy-Setup screen appears.
3. Select **Test** and press Enter.
4. Select **Memory** and press Enter to run the memory test on base memory. If an error appears, replace the system board.
5. Power off the computer and reinstall the DIMM; then power on the computer. Verify the memory size; then test the memory. If an error appears, replace the DIMM.

If memory problems occur intermittently, make sure the DIMM socket latches are latched completely. If the DIMM latches are securely latched, use the loop option to repeat the test. When the test detects an error, an error log is printed on the printer connected to the parallel port. See "Error Log" on page 55 for more information.

System Programs in Flash Memory: System setup programs and diagnostic tests are stored in flash memory.

Flash Memory Update: A flash memory update is required for the following conditions:

- New versions of system programs.
- New features or options are added.

To update the flash memory, do the following:

1. Get the appropriate diskette containing the update.
2. Insert the **System Program Service Diskette** into drive A and power on the computer.
3. Select **Update system programs** from the menu.

System Board and CPU Card Checkout

The processing functions are performed by both the system board and the CPU card. Processor problems can be caused by either FRU. However, the CPU card generally has a lower probability of failure. When a numeric code calls the system board or the CPU card as a FRU, or the CPU card is called by a diagnostic test by showing FRU code 11, use the following procedure to isolate the problem:

1. Run the system board test to verify the symptom. This test verifies both the system board and the CPU card. If no error is detected, return to "Checkout Guide" on page 30.
2. If FRU code 10 appears, replace the system board but do not replace the CPU card. Transfer the CPU card from the old system board to the new system board.
3. If FRU code 11 appears, reseal the CPU card.
4. Rerun the test to verify the fix.
5. If FRU code 11 remains, replace the CPU card.

If above procedure does not correct the problem, go to "Undetermined Problems" on page 50.

Keyboard/Auxiliary Input Device Checkout

Remove the external keyboard if the internal keyboard is to be tested.

If the internal keyboard does not work or an unexpected character appears, make sure that the three flexible cables extending from the keyboard are correctly seated in the connectors on the keyboard card.

If the keyboard cable connections are correct, check the keyboard card.

TrackPoint III Checkout

If the TrackPoint III will not work, check the configuration in the ThinkPad Features program. If the configuration of the TrackPoint III is disabled, select **Enable** to enable it.

If this does not correct the TrackPoint III problem, continue with the following steps.

The TrackPoint III does automatic compensations to adjust the pointer sensor. During this process, the pointer moves on the screen automatically for a short time. This self-acting pointer movement can occur when a slight, steady pressure is applied to the TrackPoint III pointer while the computer is powered on or while the system is running, or when re-adjustment is required because the temperature has exceeded its normal temperature range. This symptom does not indicate a hardware problem. No service actions are necessary if the pointer movement stops in a short period of time.

If a click button problem or pointing stick problem occurs, do the following:

1. Go to the Easy-Setup screen.
2. Select an item with the pointing stick.
3. Press either the left or right click button.
4. Verify that both buttons work correctly.

If either the pointing stick or the click button do not work, do the following actions one at a time to correct the problem. Do not replace a non-defective FRU.

- Reseat the keyboard card cables.
- Replace the keyboard.
- Replace the keyboard card.
- Replace the system board.

Port Replicator Game Port Checkout

Do the following if a Port Replicator joystick problem occurs:

1. Connect the joystick to the Port Replicator game port.
2. Go to the Easy-Setup screen.
3. Select an item with the joystick.
4. Press any button of the joystick.
5. Verify that all buttons work correctly.

If either the joystick or a button does not work, replace the Port Replicator. If the problem still remains, replace the system board.

Diskette Drive Test

Do the following to isolate the problem to a controller, drive, or diskette. A scratch, write enabled, non-defective 2HD diskette is required.

FDD-1 represents the built-in diskette drive for 365X.
FDD-2 represents a diskette drive in the Port Replicator or

a diskette drive attached through the external diskette drive connector.

Warning: Make sure that the diskette does not have more than one label attached to it. Multiple labels can cause damage to the drive or can cause the drive to fail.

Do the following to select the test device:

1. Select the advanced diagnostics mode and select **Tool**; then select the **FDD-1** or **FDD-2** icon and press the spacebar. A mark appears next to the selected icon. Insert a **blank** diskette when instructed.
2. Run the diskette drive test.
3. If the controller test detects an error, FRU code 10 appears. Replace the system board.
4. If the controller test runs without errors, the drive read/write tests start automatically.
5. If the drive test detects an error, FRU code 50 for FDD-1 or 51 for FDD-2 appears. If the diskette itself is known to be good, replace the drive.

Status Indicators Checkout

If a status indicator LED problem occurs, do the following:

1. Power off the computer.
2. Power on the computer.
3. All the LEDs in the status indicator panel turn on for a moment soon after the computer is powered on. Verify that all indicators turn on correctly.

If some of the indicators do not turn on, replace the LED indicator card.

If the problem still remains, replace the keyboard card.

Power Systems Checkout

To verify the symptom of the problem, power on the computer using each of the power sources as follows:

1. Remove the battery pack, diskette drive, and hard disk drive.
2. Connect the AC Adapter and check that power is supplied.
3. Install the diskette drive or hard disk drive one at a time, and check that power is supplied from each power source.
4. Disconnect the AC Adapter, remove the hard disk and diskette drive, and install the charged battery pack; then check that power is supplied by the battery pack.

If you suspect a power problem, see the appropriate power supply check listed below.

“Checking the AC Adapter” on page 35.

“Checking Operational Charging” on page 36.

“Checking the Battery Pack” on page 36.

“Checking the Backup Battery” on page 37.

Checking the AC Adapter: You are here because the computer fails only when the AC Adapter is used.

If the power problem occurs only when a Port Replicator is used, replace the replicator.

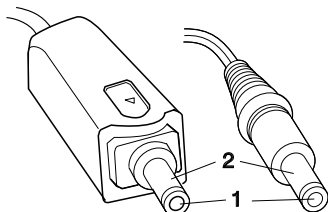
If the power-on indicator does not turn on, check the power cord of the AC Adapter for correct continuity and installation.

If the operational charge does not work, go to "Checking Operational Charging" on page 36.

Note

There are two types of adapters. The procedure for checking both types is the same.

1. Unplug the AC Adapter cable from the computer and measure the output voltage at the plug of the AC Adapter cable. See the following figure:



(16 - 10 V)

Pin	Voltage (V dc)
1	+14.5 to +17.0
2	Ground

If the voltage is correct, replace the system board.
If the problem is not corrected, go to "Undetermined Problems" on page 50.

If the voltage is not correct, go to the next step.

2. Unplug the AC Adapter cable from the ac power outlet and wait five minutes or longer to allow the over-voltage protection circuit to be fully discharged and initialized.
3. Plug the AC Adapter cable into the ac power outlet.
4. Measure the output voltage of the AC Adapter.
5. If the voltage is still not correct, replace the AC Adapter.

Note

An audible noise from the AC Adapter does not always indicate a defective adapter.

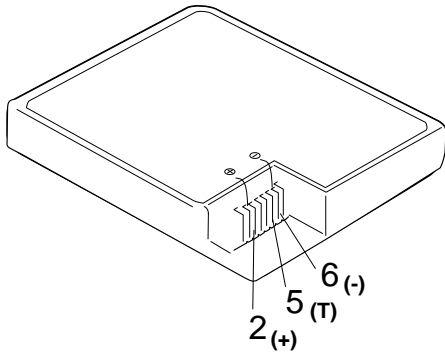
Checking Operational Charging: To check operational charging, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

Perform operational charging. If the battery status indicator does not turn on, remove the battery pack and leave it to return to room temperature. Reinstall the battery pack. If the charge indicator still does not turn on, replace the battery pack.

Checking the Battery Pack: Battery charging will not start until the Fuel-Gauge shows that less than 95% of the total power remains; with this condition the battery pack will charge to 100% of its capacity. This protects the battery pack from being overcharged or having a shortened life.

Do the following:

1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 2 (+) and 6 (-). See the following figure:



Terminal	Voltage (V dc) / Signal
1	—
2	+8 to +13.5
3	—
4	—
5	Thermal
6	Ground (-)

Note

Signal lines, not used in these steps, are used for communication between the system and the battery.

3. If the voltage is less than +9.6 V dc, the battery pack has been discharged. Recharge the battery pack.
If the voltage is still less than +9.6 V dc after recharging, replace the battery.

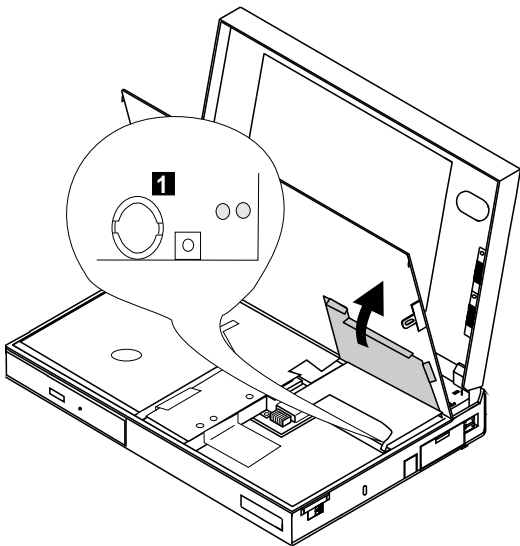
Note

If the voltage of the battery pack is 0 V, it is not defective.

4. If the voltage is more than +9.6 V dc, measure the resistance between battery terminals 5 and 6. The resistance must be 4 K to 30 K ohm.
If the resistance is not correct, replace the battery pack. If the resistance is correct, replace the system board.

Checking the Backup Battery

1. Power off the computer and unplug the AC Adapter from the computer.
2. Open the keyboard and remove the battery pack.
3. Lift the right-hand section of the black insulator sheet.
4. Locate the backup battery on the system board, shown at 1 .



5. Using a plastic tool, remove the backup battery from the system board.

DANGER

Do not use a metal tool when removing the backup battery. Use only a plastic tool.

6. Measure the voltage of the backup battery. Refer to the following table for voltages:

Wire	Voltage (V dc)
+	+2.5 to +3.7
-	Ground

If the voltage is correct, replace the system board.
If the voltage is not correct, the backup battery has been discharged. Replace the backup battery.
If the backup battery discharges quickly after replacement, replace the system board.

Power Management Features

Three power management modes are provided by the computer to reduce power consumption and prolong battery power.

Standby Mode: When in standby mode the following occurs:

The LCD backlight turns off.
The hard disk motor stops.

Events that cause the computer to enter standby mode:

Standby requested by the Fn key. (Fn+F3)
No activity under **auto-standby** enabled by the ThinkPad Features program.

Events that cause the computer to exit or resume standby mode:

(Resume) Any key operation.

Suspend Mode: When in suspend mode, the following, in addition to the two actions of standby mode, occur:

The LCD is powered off.
The hard disk is powered off.
The CPU is stopped.

Notes

1. In the ThinkPad Features Program, the computer can be set to "Will not suspend even if LCD is closed."
2. When the computer is powered with ac power and is used with one of the communication PC cards, the computer enters *standby mode*; the PC card and application program remain active.
3. The computer cannot enter suspend mode while a communication link is running.

Events that cause the computer to enter suspend mode:

Suspend mode is requested by the Fn key (Fn+F4).
The LCD is closed.
The specified time has elapsed from the last operation with the keyboard, mouse, hard disk drive, parallel connector, or diskette drive; or the AC Adapter is plugged in. The time is specified by **Suspend Timer** in the ThinkPad Features program.
The battery condition is low. The battery power indicator blinks amber.
Either the *PS2 OFF* or *PS2 SUSpend* command is set in the ThinkPad Features program.

Events that cause the computer to exit or resume suspend mode:

(Resume) The LCD is opened.
(Resume) The real time clock alarm is signaled.
(Resume) The ring indicator (RI) is signaled by a serial or PCMCIA device.
(Resume) The Fn key is pressed.
(Resume) An external keyboard key is pressed while operating with ac power.
(Exit) Timer (timeout) conditions are satisfied for entering hibernation mode.

Hibernation Mode: When in hibernation mode, the following occurs:

The system status, RAM, VRAM, and setup data are stored on the hard disk.
The system is powered off.

Note

The computer cannot enter hibernation mode when the computer is powered with ac power and a communication PC card is used.

Events that cause the computer to enter hibernation mode:

The keyboard is opened.
Hibernation mode is requested by the Fn key (Fn+F12).
Timer/timeout conditions are satisfied in suspend mode.
A critical low battery condition occurs.
The *PS2 HIBernation* command is set in the ThinkPad Features program.

Event that causes the computer to exit hibernation mode:

The power-on switch is operated.

When power is turned on, the hibernation history in the boot record on the hard disk is recognized and system status is restored from the hard disk to resume operation.

Symptom-to-FRU Index

The Symptom-to-FRU Index lists the symptoms and errors and the possible causes. The most likely cause is listed first.

Note

Perform the FRU replacement or actions in the sequence shown in the "FRU/Action" columns. If a FRU did not solve the problem, put the original part back in the computer. Do not replace a non-defective FRU.

This index can also be used to help you decide which FRUs to have available when servicing a computer.

Numeric error codes show the errors detected in POST or system operation. In the following error codes, **X** can be any number.

If no codes are available, use narrative symptoms.

If the symptom is not listed, go to "Undetermined Problems" on page 50.

Note

For any IBM device not supported by the diagnostic codes in this ThinkPad computer, see the manual for that device.

Numeric Error Codes

Symptom / Error	FRU / Action in Sequence
10X 101 Interrupt failure. 102 Timer failure. 103 Timer interrupt failure. 104 Protected mode failure. 105 Last 8042 command not accepted. 107 NMI test failure. 108 Timer bus test failure. 109 Low meg-chip select test.	1. System Board
110 (Planar parity.)	1. Go to "Memory Checkout" on page 31. 2. DIMM 3. The computer is attached to a Port Replicator. 4. System Board

Symptom / Error	FRU / Action in Sequence
111 (I/O parity.)	<ol style="list-style-type: none"> 1. Go to "Memory Checkout" on page 31. 2. Port Replicator 3. System Board
158 (HDP was not set even though the supervisor password is set.)	<ol style="list-style-type: none"> 1. Set an HDP for the hard disk drive.
159 (HDP is not set the same as the supervisor password.)	<ol style="list-style-type: none"> 1. Set a correct HDP for the hard disk drive.
161 (Dead battery.)	<ol style="list-style-type: none"> 1. Go to "Checking the Backup Battery" on page 37. 2. Backup Battery 3. System Board
163 (Time and Date were not set.)	<ol style="list-style-type: none"> 1. Set Time and Date. 2. Backup Battery 3. System Board
173 (Configuration data was lost.)	<ol style="list-style-type: none"> 1. Select OK in the error screen; then set the time and date. 2. Backup Battery 3. System Board
174 (Configuration error: Perform "Checking the Installed Devices List" on page 57 before changing any FRUs.)	<ol style="list-style-type: none"> 1. Check Device Configuration. 2. System Board 3. Diskette Drive Assembly 4. Hard Disk Drive Assembly
175, 177, 178 175 EEPROM CRC #1 error. 177 Supervisor password check sum error. 178 EEPROM is not functional.	<ol style="list-style-type: none"> 1. System Board
183 (Incorrect password entered at the supervisor password prompt.)	<ol style="list-style-type: none"> 1. Have the user examine the password.
184 (POP check sum error.)	<ol style="list-style-type: none"> 1. Reset the POP (power-on password) in Easy-Setup.
185 (The startup sequence is not valid. Suspect that power was off when the startup sequence was being updated.)	<ol style="list-style-type: none"> 1. Reset the startup sequence in Easy-Setup.
186	<ol style="list-style-type: none"> 1. System Board

Symptom / Error	FRU / Action in Sequence
188 (EEPROM CRC #2 error.)	1. Set the system identification using the ThinkPad 750Ce hardware maintenance diskette.
190 (Depleted battery pack was installed when the power was on.)	1. Go to “Checking the Battery Pack” on page 36.
191XX (PM initialization error.)	1. System Board 2. CPU card
195 (The configuration read from the hibernation area does not match the actual configuration.)	1. Check if the configuration was changed. For example, check if the hard disk drive is from another computer. Also, when a DIMM card has been installed, unsecured DIMM latches can result in this error. Make sure the DIMM is securely seated and fully latched into place.
196 (Read error occurred in the hibernation area of the HDD.)	1. Run the hard disk drive test. 2. Hard Disk Drive
199XX (Resume error.)	1. System Board
1XX	1. System Board
2XX 201 Memory data error. 202 Memory line error 00–15. 203 Memory line error 16–23. 205 Memory test failure on on-board memory. 221 ROM to RAM remap error.	1. Go to “Memory Checkout” on page 31. 2. DIMM 3. System Board
301, 303, 304, 305, 3XX (301: Keyboard error.)	1. Go to “Keyboard/Auxiliary Input Device Checkout” on page 32. 2. Keyboard 3. External Numeric Keypad 4. External Keyboard 5. Keyboard/Mouse Cable 6. Keyboard Card 7. System Board

Symptom / Error	FRU / Action in Sequence
601, 6XX (601: Diskette drive or controller error.)	<ol style="list-style-type: none"> 1. Go to "Diskette Drive Test" on page 33. 2. Diskette Drive Assembly 3. Diskette 4. System Board
602 (Diskette read error.)	<ol style="list-style-type: none"> 1. Go to "Diskette Drive Test" on page 33. 2. Diskette 3. Diskette Drive Assembly
604 (Unacceptable ID was read from the diskette drive.)	<ol style="list-style-type: none"> 1. Go to "Diskette Drive Test" on page 33. 2. Diskette Drive Assembly 3. System Board
11XX 1101: Serial_A test failure.	<ol style="list-style-type: none"> 1. Serial Device 2. Communication Cable 3. System Board
12XX 1201: Serial_B test failure.	<ol style="list-style-type: none"> 1. System Board
17XX 1701 Hard disk controller failure. 1780, 1790 Hard disk 0 error. 1781, 1791 Hard disk 1 error.	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. System Board
24XX (2401: System board video error.)	<ol style="list-style-type: none"> 1. System Board
808X 8081 PCMCIA presence test failure. (PCMCIA revision number also checked.) 8082 PCMCIA register test failure.	<ol style="list-style-type: none"> 1. Reseat the PCMCIA Connector. 2. PCMCIA Slot Assembly 3. PCMCIA Device 4. System Board
860X (Pointing device error when TrackPoint III is disabled.) 8601 System bus error—8042 mouse interface. 8602 External mouse error. 8603 System bus error or mouse error.	<ol style="list-style-type: none"> 1. External Mouse 2. External Keyboard 3. System Board

Symptom / Error	FRU / Action in Sequence
861X (Pointing device error when TrackPoint III is enabled.) 8611 System bus error—I/F between 8042 and IPDC. 8612 TrackPoint error. 8613 System board or TrackPoint error.	<ol style="list-style-type: none"> 1. Reseat the keyboard connector. 2. Reseat the keyboard TrackPoint III cable on the keyboard card. See “1070 Keyboard Unit” on page 73. 3. Keyboard 4. External Mouse 5. System Board
I9990301 I9990302 I9990305 I9990301 Hard disk error. I9990302 Invalid hard disk boot record. I9990305 No bootable device.	<ol style="list-style-type: none"> 1. Reseat the boot device. 2. Check the startup sequence for the correct boot device. 3. Check that the operating system has no failure and is installed correctly.
I9990303 (Bank 2 flash ROM check sum error.)	<ol style="list-style-type: none"> 1. System Board
Other codes not listed above	<ol style="list-style-type: none"> 1. Go to “Undetermined Problems” on page 50.

Beep Symptoms

Symptom / Error	FRU / Action in Sequence
Continuous beeps.	System Board
One beep and a blank, unreadable, or flashing LCD.	<ol style="list-style-type: none"> 1. Reseat the LCD connector. 2. LCD Assembly 3. System Board
One beep, and the message “Unable to access boot source.”	<ol style="list-style-type: none"> 1. Boot device 2. System Board
One long beep, two short beeps, and a blank or unreadable LCD.	<ol style="list-style-type: none"> 1. System Board 2. LCD Assembly
One long beep followed by four short beeps each time the power switch is operated. (System cannot power on because of low battery voltage.)	Connect the AC Adapter or install a fully charged battery.
One beep every second. (System shuts down because of low battery voltage.)	Connect the AC Adapter or install a fully charged battery (allows system to complete shutdown before changing the battery).

Symptom / Error	FRU / Action in Sequence
Two short beeps with error codes.	POST error. See “Numeric Error Codes” on page 40.
Two short beeps with blank screen.	System Board

No-Beep Symptoms

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator not on, and a blank LCD during POST.	<ol style="list-style-type: none"> 1. Go to “Power Systems Checkout” on page 34. 2. System Board 3. Power sources
No beep, power-on indicator on, and a blank LCD during POST.	<ol style="list-style-type: none"> 1. System Board 2. CPU Card
No beep, power-on indicator on, and a blinking cursor only during POST.	<ol style="list-style-type: none"> 1. System Board 2. CPU Card
No beep during POST but system runs correctly.	<ol style="list-style-type: none"> 1. Turn the volume up and check the speaker. 2. Speaker / Volume Switch Assembly

LCD-Related Symptoms

Important

The TFT LCD on some models of this computer contains over 1,440,000 thin-film transistors (TFTs). A small number of missing, discolored, or lighted dots (on all the time) is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of dots satisfies the following condition:

The number of missing, discolored, or lighted dots in any background is 21 or more.

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator on, and a blank LCD during POST.	<ol style="list-style-type: none"> 1. System Board 2. CPU Card
LCD backlight not working, or LCD too dark, or LCD brightness cannot be adjusted, or LCD contrast cannot be adjusted.	<ol style="list-style-type: none"> 1. Reseat the LCD connectors. 2. LCD Assembly
LCD screen unreadable, or Characters missing pels, or Screen abnormal, or Wrong color displayed.	<ol style="list-style-type: none"> 1. See important note for "LCD-Related Symptoms." 2. Reseat all LCD connectors. 3. LCD Assembly 4. System Board
LCD has extra horizontal or vertical lines displayed.	LCD Assembly

Keyboard/TrackPoint III–Related Symptoms

Symptom / Error	FRU / Action in Sequence
Keyboard (one or more keys) does not work.	<ol style="list-style-type: none"> 1. Reseat the keyboard connector. 2. Reseat the three keyboard cables on the keyboard card. 3. Keyboard 4. Keyboard Card 5. System Board
TrackPoint III does not work.	<ol style="list-style-type: none"> 1. Reseat the keyboard connector. 2. Go to “TrackPoint III Checkout” on page 33. 3. Keyboard 4. System Board
Pointer moves automatically or does not work correctly.	<ol style="list-style-type: none"> 1. See “TrackPoint III Checkout” on page 33.

Indicator–Related Symptoms

Symptom / Error	FRU / Action in Sequence
Indicator incorrectly remains off or on, but system runs correctly.	<ol style="list-style-type: none"> 1. Reseat the LED Indicator Card cable. 2. LED Indicator Card 3. System Board

Power–Related Symptoms

Symptom / Error	FRU / Action in Sequence
Power shuts down during operation.	<ol style="list-style-type: none"> 1. Go to “Power Systems Checkout” on page 34. 2. Battery Pack 3. Remove the battery pack and let it cool for two hours. 4. Power sources
The system will not power off.	System Board

Function–Related Symptoms

Symptom / Error	FRU / Action in Sequence
The system will not enter hibernation mode by opening the keyboard.	<ol style="list-style-type: none"> 1. Go to “Hibernation Mode” on page 39 and check whether the computer can enter hibernation mode. 2. Enable hibernation mode using the ThinkPad Features program. 3. Boot an operating system and press Fn+F12. If the computer enters hibernation mode, suspect that the application program is not working properly. 4. CPU Card 5. Initialize the system in Easy-Setup. 6. System Board
The system will not suspend or resume by opening or closing the LCD.	<ol style="list-style-type: none"> 1. Go to “Suspend Mode” on page 38, and check that the computer can enter suspend mode. 2. Boot an operating system and press Fn+F4. If the computer enters suspend mode, suspect that the application program is not working properly. 3. Initialize the system in Easy-Setup. 4. Keyboard Card 5. System Board
Battery Fuel-Gauge does not go higher than 90%.	Go to “Checking the Battery Pack” on page 36 and see the note.
Memory count (size) appears different from actual size.	Go to “Memory Checkout” on page 31.
System configuration does not match the installed devices.	Go to “Checking the Installed Devices List” on page 57.
System hangs intermittently.	Go to “Intermittent Problems” on page 49.

Peripheral Device–Related Symptoms

Symptom / Error	FRU / Action in Sequence
External display does not work correctly.	1. See “ External Display Self-Test ” in “ Common Devices Checkout ” section.
Printer problems.	1. Run Printer Self-test. 2. Parallel Port Device 3. Cable 4. System Board
Serial or parallel port device problems.	1. Device 2. Device Cable 3. System Board

Infrared–Related Symptoms

Symptom / Error	FRU / Action in Sequence
Unable to communicate using the Infrared (IR) Port.	1. Make sure the setup for the IR is correct. 2. Make sure there are no fluorescent lights near the computer. The computer may receive optical interference from the fluorescent light. 3. Reseat the IR unit. 4. Run the advanced diagnostic test. If an error occurs and a FRU code is displayed, replace the parts shown by the FRU code.

Other Symptoms

Symptom / Error	FRU / Action in Sequence
Errors occur only when Port Replicator is used.	See “ Port Replicator Checkout ” in the “ Common Devices Checkout ” section.
PCMCIA slot pin is damaged.	PCMCIA Slots Assembly

Note

If you cannot find a symptom or error in this list and the problem remains, see “Undetermined Problems” on page 50.

Intermittent Problems

Intermittent system hang problems can be caused by a variety of reasons that have nothing to do with a hardware defect, such as: cosmic radiation, electrostatic discharge, or software errors. FRU replacement should only be considered when a recurring problem exists.

When analyzing the intermittent problem, do the following:

1. Run the advanced diagnostic test for the system board in loop mode at least 10 times.
2. If no error is detected, do **not** replace any FRUs.
3. If any error is detected, replace the FRU shown by the FRU code. Rerun the test to verify that no more errors exist.

Undetermined Problems

You are here because the diagnostic tests did not identify which adapter or device failed, installed devices are incorrect, a short circuit is suspected, or the system is inoperative. Follow the procedures below to isolate the failing FRU (do not isolate non-defective FRUs).

Verify that all attached devices are supported by the computer.

Verify that the power supply being used at the time of the failure is operating correctly. (See "Power Systems Checkout" on page 34.)

1. Power off the computer.
2. Check the cables, wires, and connectors for short circuits and open circuits. Visually check them for damage. If any problems are found, replace the FRU.
3. Remove or disconnect all of the following devices.
 - a. Non-IBM devices
 - b. Devices attached to the expansion bus connector
 - c. Printer, mouse, and other external devices
 - d. Battery pack
 - e. Hard disk drive
 - f. Internal diskette drive or CD-ROM drive
 - g. DIMM
 - h. PC Cards
4. Power on the computer.
5. Determine if the problem has changed.
6. If the problem does not occur again, reconnect the removed devices one at a time until you find the failing FRU.
7. If the problem still remains, remove the backup battery and wait for 3 minutes; then replace the backup battery and set current date and time.
8. Determine if the problem has changed.
9. If the problem remains, replace the following FRUs one at a time. Do not replace a non-defective FRU.
 - Keyboard card
 - LCD assembly
 - System board
 - CPU card

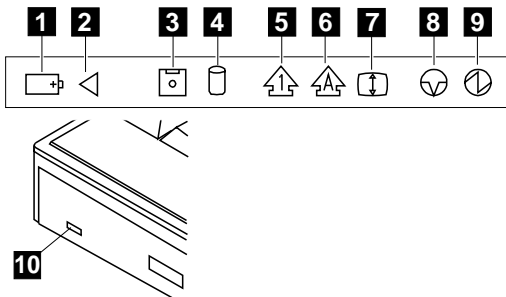
Related Service Procedures


This section provides information about the following:







- “Status Indicators”
- “How to Run the Diagnostics” on page 54
- “Diagnostic Error Codes” on page 55
- “Error Log” on page 55
- “Checking the Installed Devices List” on page 57
- “Password Combinations (POP, HDP, PAP)” on page 58
- “How to Run a Low-Level Format” on page 58
- “PC Test Card LED” on page 58
- “Fn Key Combinations” on page 59
- “Keyboard/Auxiliary Input Device Checkout” on page 32



Status Indicators

The system status LED indicators show the current computer status in green and amber using symbols. The following shows the location of each symbol and the meaning of each indicator.



Symbol	Color	Meaning
1 Battery Power Status 	Green	Indicates that sufficient power remains for operation. The battery power status cannot be determined when the battery is not installed in the computer.
	Blinking Amber	Indicates that the battery pack needs charging. When the indicator starts blinking amber, the computer beeps three times.

Symbol	Color	Meaning
2 Battery Charging 	Green	Indicates that the battery pack is charging. When the indicator turns off, the battery pack is fully charged.
	Off	Indicates that the battery pack is charged (if the AC Adapter is attached).
3 Diskette Drive In Use 	Amber	Turns on when data is written to or read from the internal diskette drive.
4 Hard Disk In-Use 	Amber	Turns on when data is read from or written to the hard disk or internal CD-ROM. Do not enter suspend mode or turn off the computer when this indicator is on.
5 Numeric Lock 	Green	When on, indicates the numeric keypad on the keyboard is enabled. You enable and disable the keypad by pressing and holding the Shift key. Then press the NumLk key.
6 Caps Lock 	Green	When on, indicates the Caps Lock mode is enabled. All alphabetic characters (A–Z) are entered in capital letters without pressing the Shift key. You enable and disable Caps Lock mode by pressing the Caps Lock key.
7 Scroll Lock 	Green	Alternately turns on and off each time the Scroll Lock key is pressed. While this indicator is on, the Arrow keys are used as screen-scroll function keys. In this state, the cursor cannot be moved with the Arrow keys. Not all application programs support this function.

Symbol	Color	Meaning
8 Suspend Mode 	Green	When on, indicates the computer is in suspend mode.
	Blinking Green	Indicates that the computer is entering suspend mode or hibernation mode, or the computer is resuming normal operation.
9 Power On 	Green	Shows that the computer is operational. This indicator turns on when the computer is turned on and the computer is not in suspend mode.
1 CD-ROM Drive / Diskette Drive In-Use LED	Amber	365XD: turns on when data is read from a CD in the CD-ROM drive. Do not enter suspend mode or eject the CD when this indicator is on.
	Amber	365X: turns on when data is read from or written to a diskette in the internal diskette drive. Do not enter suspend mode or eject the diskette when this indicator is on.

How to Run the Diagnostics

Use either the TrackPoint III or the cursor move keys to interact with the tests. The Enter key works the same as selecting the OK icon to reply OK.

Note

Make sure you have the following tools available before starting the tests:

Wrap Plug (P/N 72X8546) for the serial and parallel connector tests.
Wrap Plug (P/N 35G4680) for the PCMCIA tests.
Scratch diskette for the FDD1 or FDD2 tests.
Any data CD for the CD-ROM drive test.

1. Press and hold the F1 key; then power on the computer. Hold the F1 key down until the Easy-Setup screen appears.
2. Select **Test** and press Enter.
3. Select a device and press Enter to run the test.
4. The test progress screen appears.
5. **OK** appears when the test ends without any errors.
6. Start the **Advanced Diagnostic test** by pressing **Ctrl+A** on the basic diagnostic menu screen.
7. Select **Tool** to install the tools.
8. Select a device, press the **Spacebar** and install the tool. Multiple devices can be selected by repeating this step.
A **A** mark appears beside the selected devices.
9. Select **OK** and press Enter if the selection is OK.
10. Select a device and press Enter to start the tests.
11. Select **Test All** to test all devices.
12. Select **Loop Test** to run the tests in a repeated loop.
A loop option menu appears in which a device loop or all-device loop can be selected. Select a device and press the **Spacebar** to select a device. Repeat this step to select multiple devices. Press Enter to start the diagnostic loop. If no device is selected, all device tests are looped.
13. To exit the loop, keep pressing **Ctrl+Pause** until the test exits. A beep sounds to notify that the exit interrupt is sensed by the test program.

Error Log

Diagnostic errors are printed on the printer that is attached to the parallel port when the error is detected. The error is also logged in the system memory.

Do the following to display the errors:

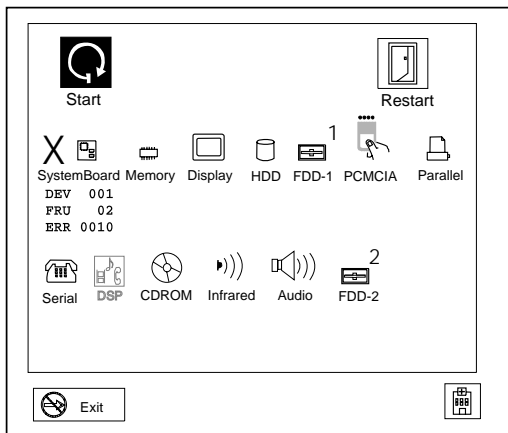
1. End the test, if it is running.
2. Press **Ctrl+A** to select the advanced diagnostic mode.
3. Press **Ctrl+E**.
4. The error log appears.
5. To exit the screen, select the cancel icon or press Esc.

The error log is not saved when the system is powered-off.

Diagnostic Error Codes













If an error is detected, the following appears:

- Large **X** on the left side of the device icon.
- Device ID (three digit)
- Error code (two digit)
- FRU code (four digit)



The device ID and error code are used to indicate the detail portion of the FRU which caused the error. If replacing a FRU does not correct the problem, see the device ID or error code from the previous failure. If they have changed, the cause might be because the new FRU is defective or that the FRU was incorrectly installed.

Device ID: If an error is detected by the diagnostic tests, a three-digit device ID is displayed. The device ID indicates the suspected device.

Icon	Device ID	Suspected Device
 SystemBoard	001	System Board
	003	Keyboard
	007	Math Coprocessor
	086	Pointing Device
 Memory	002	Memory
 Display	050	Display
 HDD	017	Hard Disk Drive
1  FDD-1	006	Diskette Drive
2  FDD-2	066	External Diskette Drive
 PCMCIA	080	PCMCIA
 Parallel	009	Parallel
 Serial	011	Serial
 CDROM	215	CD-ROM
 Infrared	103	Infrared port
 Audio	150	Audio (ESS AudioDrive Sound Chip)

FRU Codes: If an error is detected by the diagnostic tests, a *four-digit* FRU code is displayed. The FRU code indicates two suspected FRUs. Replace the FRU that is indicated by the *two leftmost digits* first, then replace the FRU indicated by the *two rightmost digits*. No FRU is assigned to code 00. If only one FRU is suspected, the other FRU code is filled with zeros. See the referenced page before replacing the FRU.

FRU Code	FRU/Action
10	System Board
11	CPU Card
20	Memory (See "Memory Checkout" on page 31.)
30	Reserved
32	External Keyboard
33	External Mouse
40	LCD Assembly
45	External CRT
50	1. Reseat the Diskette Drive (FDD-1) 2. Diskette Drive (FDD-1)
51	1. Reseat the Diskette Drive (FDD-2) 2. Diskette Drive (FDD-2)
60	1. Reseat the Hard Disk Drive (HDD) 2. Hard Disk Drive (HDD)
72	PCMCIA Slot Assembly
90	CD-ROM Drive

If the problem remains after replacement of the FRUs, go to "Undetermined Problems" on page 50.

Checking the Installed Devices List

If a device is installed but the icon appears in a gray shade rather than a dark shade on the basic diagnostics screen, the device is defective. Reseat the device connectors. If the symptom remains, replace the device or the system board. If needed, adjust the contrast control to clearly distinguish the shade of the icon.

If a device that is not installed appears in a dark shade (for example, FDD-2 appears in a dark shade when *no* second FDD is installed), do the following:

1. Replace the **first** device in the configuration, such as the FDD-1.
2. If the problem remains, replace the system board.

The PCMCIA, Parallel, and Serial icons are always displayed in a dark shade because the icons represent subsystems of the system board and not the actual attachment of the devices.

The FDD-1 icon represents the **first** drive in the system configuration. Similarly, the FDD-2 icon represents the **second** drive, attached to the external diskette drive connector or through a Port Replicator.

Password Combinations (POP, HDP, PAP)

When the power-on password (POP), hard disk password (HDP), and supervisor password (PAP) are used, the following situations may occur:

When the POP is the same as the HDP

The POP prompt appears, but the HDP prompt does not appear.

When the POP is not the same as the HDP

The POP and HDP prompts both appear.

When the PAP and HDP are enabled

When a PAP is used, the HDP is enabled automatically, but no HDP prompt appears. The HDP is set to the same password as the PAP.

How to Run a Low-Level Format

Do the following to format the hard disk.

Warning: Make sure the drive address to be formatted is correct. This procedure will erase all information on the disk.

1. Power off the computer.
2. Insert the **ThinkPad 750Ce hardware maintenance diskette** into diskette drive **A** and power on the computer.

Note

You can use this maintenance diskette for the ThinkPad 365X and 365XD computers.

3. Select **Format the hard disk** from the main menu.
4. Select the drive from the menu.
5. Follow the instructions on the screen.

PC Test Card LED

The green LED on the PC test card turns on when the PCMCIA test is running. If the LED does not turn on, check that the card is installed correctly by reseating the card. If it still does not turn on after it is reseated, try using another slot for the test. If the LED still does not turn on and the test fails, replace the FRU shown by the diagnostic error code.

Fn Key Combinations

The following table shows the **Fn** key and function key combinations and their corresponding functions.

The Fn key works independently from the operating system. The operating system obtains the status through the system management interface to control the system.

Fn +	Description
F1	Reserved
F2	Fuel-Gauge display ON/OFF
F3	Standby mode invocation
F4	Suspend mode invocation
F5	Reserved
F6	Reserved
F7	LCD/CRT display switching
F8	Reserved
F9	Reserved
F10	Reserved
F11	Power management mode switching (Toggles between High Power, Auto, and Customize settings.)
F12	Hibernation invocation
Page Up	Reserved
Page Down	Reserved

Product Overview (365X, 365XD)

The following table shows an overview of the system features.

Feature	Description
Processor	Intel** Pentium** 100 MHz, 120 MHz, or 133 MHz.
Bus Architecture	PCI
Memory (Standard)	8MB
Memory (Option)	8 MB, 16 MB, or 32 MB DIMM card, maximum 40 MB (70ns, 144-pin EDO)
CMOS RAM	114 bytes
SVGA Video	10.4-inch, 65,536 colors 800x600 pixel TFT color LCD 11.3-inch, 65,536 colors 800x600 pixel TFT color LCD 10.4-inch, 256 colors, 800x600 pixel DSTN color LCD 11.3-inch, 256 colors, 800x600 pixel DSTN color LCD
Diskette Drive (For 365X: built-in; for 365XD: external)	1.44MB (2-mode), 3.5-inch 1.44MB (3-mode), 3.5-inch, for Japan
Hard Disk Drive	810MB, 2.5-inch, IDE interface 1.08GB, 2.5-inch, IDE interface 1.4GB, 2.5-inch, IDE interface 2.1GB, 2.5-inch, IDE interface
I/O Port	Headphone Microphone Stereo Line-In Port Replicator
Audio	ESS AudioDrive Sound Chip Internal speaker Mechanical volume
CD-ROM (For 365XD: built-in)	5-inch, X4, X6, or X8 speed, IDE interface
Infrared Transfer	Rear IR port IrDA** 1.0 compliant 115K bps
PCMCIA** Cards	One Type III or two Type II

FRU Removals and Replacements

This section contains information about removals and replacements.

Do not damage any part. Only certified and trained personnel should service the computer.

The arrows in the “Removals and Replacements” section show the direction of movement to remove a FRU, or to turn a screw to release the FRU. The arrows are marked in numeric order, in square callouts, to show the correct sequence of removal.

When other FRUs must be removed before removing the failing FRU, they are listed at the top of the page.

To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement.

See “Locations” for internal cable connections and arrangement information.

When replacing a FRU, use the correct screw size as shown in the procedures.

Safety Notice 1: Translation on page 8

Before the computer is powered-on after FRU replacement, make sure all screws, springs, or other small parts, are in place and are not left loose inside the computer. Verify this by shaking the computer and listening for rattling sounds. Metallic parts or metal flakes can cause electrical short circuits.

Safety Notice 3: Translation on page 10

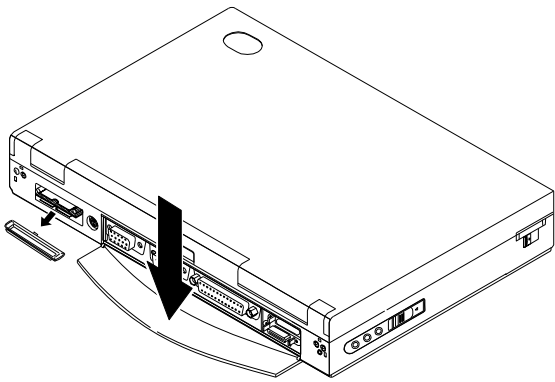
The battery pack contains small amounts of nickel. Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations.

Safety Notice 8: Translation on page 14

Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, remove the battery pack, and then disconnect any interconnecting cables.

1010 Rear Connector Door

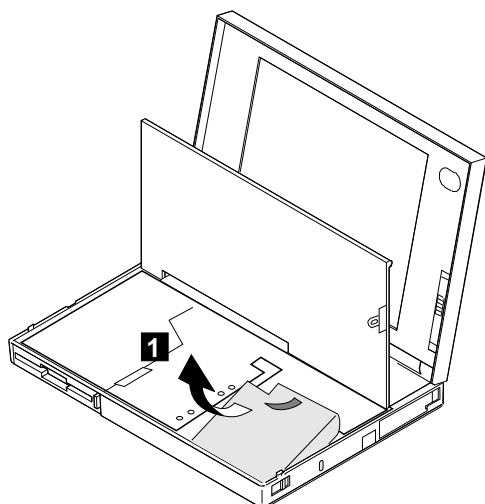
Remove the center latch, then remove the rear connector door by flexing it.



1020 Battery Pack

Note

Be careful that the computer does not fall backward when the battery pack is removed.

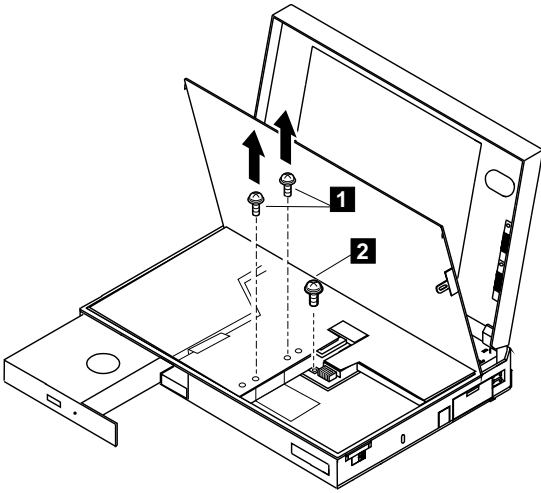


1025 Insulator Sheet

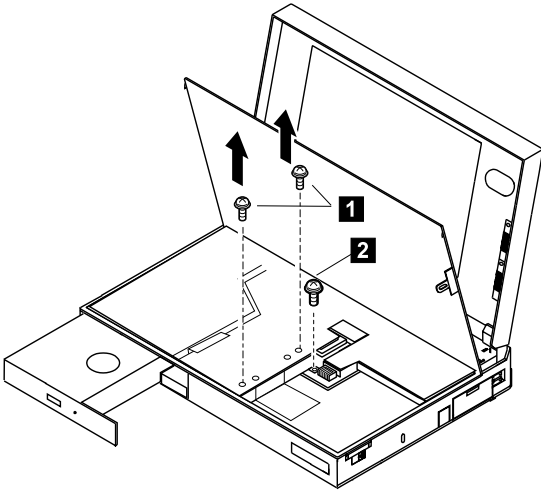
To access items under the keyboard other than the battery pack, first raise the black insulator sheet as shown in the figures.

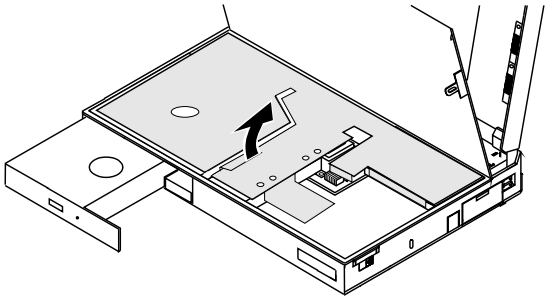
To access the hard disk drive and DIMM slots, remove the three screws and raise the middle section of the insulator sheet, as shown in the figures.

The location of the screws is different according to the model.



OR





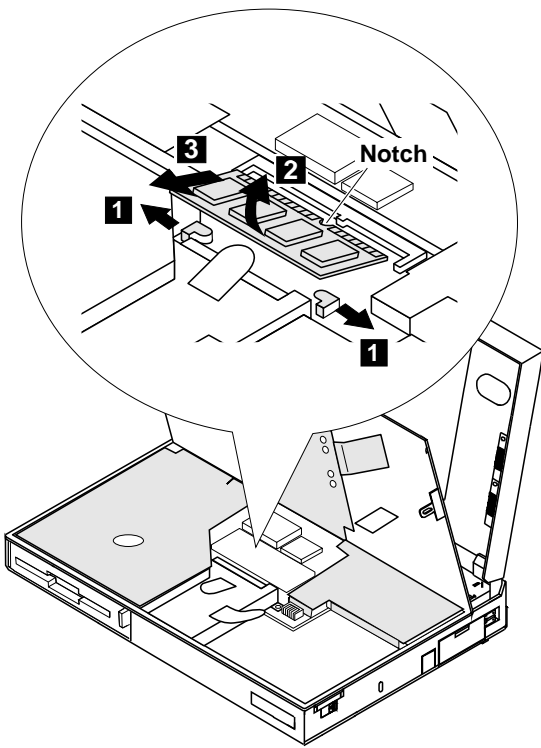
Step	Screw Location (Quantity)	Length
1	Insulator Sheet (2)	M3 x 3 mm
2	HDD Bracket (1)	M2 x 5 mm

Note: Make sure you use the correct screws when replacing.

1030 DIMM Card (If Installed)

Battery Pack (1020)

Lift Insulator Sheet (1025)



1040 Diskette Drive / CD-ROM Drive

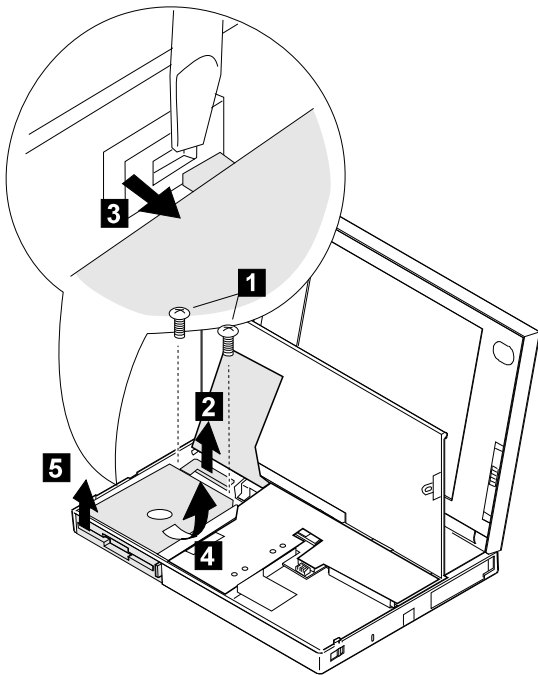
Battery Pack (1020)

Lift Insulator Sheet (1025)

Diskette Drive (Model 365X):

Note

Release the latch at the left side of the diskette drive, as shown in the figure at 3, and remove the diskette drive.



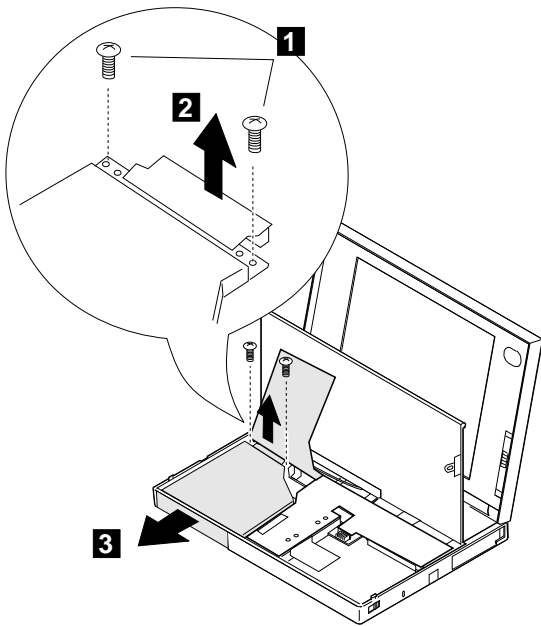
Step	Screw Location (Quantity)	Length
1	Diskette Drive (2)	M2 x 5 mm

Note: Make sure you use the correct screws when replacing.

CD-ROM Drive (Model 365XD)

Warning

Remove the CD-ROM drive exactly as shown in the figure. Do not apply any extra force to the CD-ROM drive when removing it.



Step	Screw Location (Quantity)	Length
1	CD-ROM Drive (2)	M2 x 8 mm

Note: Make sure you use the correct screws when replacing.

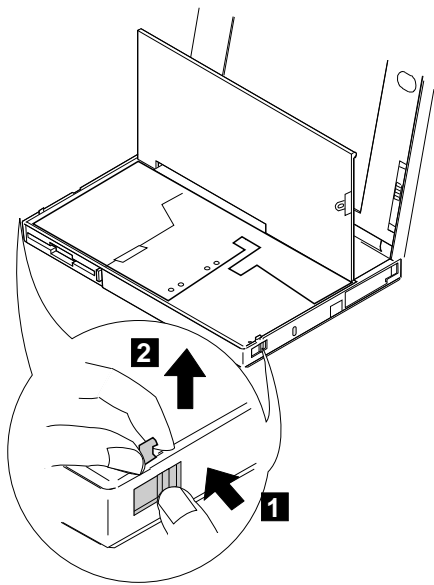
1045 Base Cover Assembly / Keyboard Latch

Battery Pack (1020)

Diskette Drive / CD-ROM Drive (1040)

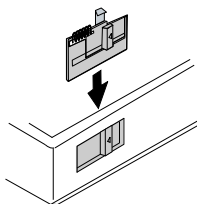
Note

Push the keyboard latch from the outside of the base cover (1), then pull out the latch (2). Some pressure might be needed to push the latch.



When replacing:

Assemble the parts as shown below; then replace the latch.



1050 Hard Disk Drive

Battery Pack (1020)

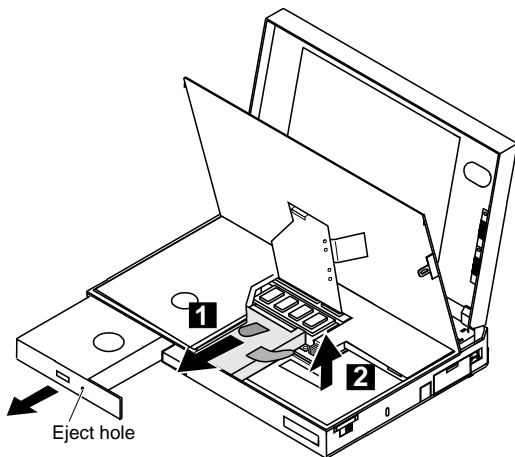
Lift Insulator Sheet (1025)

Warning

Do not drop or apply any shock to the hard disk drive. The hard disk drive is sensitive to physical shock. Incorrect handling can cause damage and permanent loss of data on the hard disk. Before removing the hard disk drive, have the user make a backup copy of all the information on the hard disk. Never remove the hard disk drive while the system is operating or is in suspend mode.

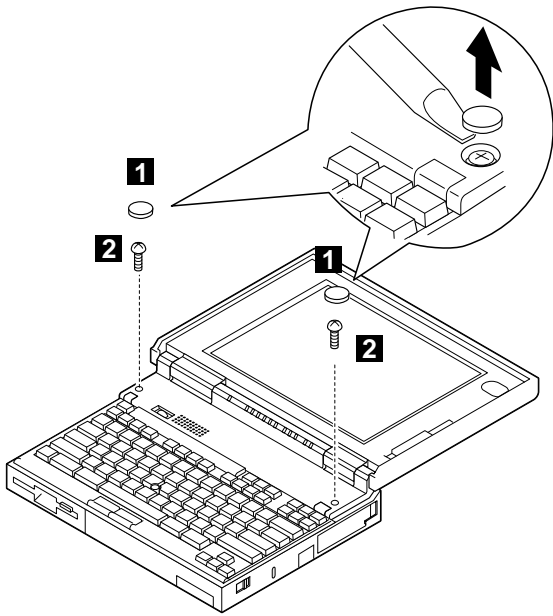
Notes

1. Before removing the hard disk drive, eject the CD-ROM tray by inserting a pin into the mechanical eject hole on the front of the CD-ROM drive. Pull the tray out fully. Otherwise, the CD-ROM drive may be damaged when you remove the hard disk drive.
2. Remove the hard disk drive exactly as shown in the figure. Do not apply any extra force to the hard disk drive when removing it.
3. This procedure is the same for Model 365X and Model 365XD.



1060 Top Cover

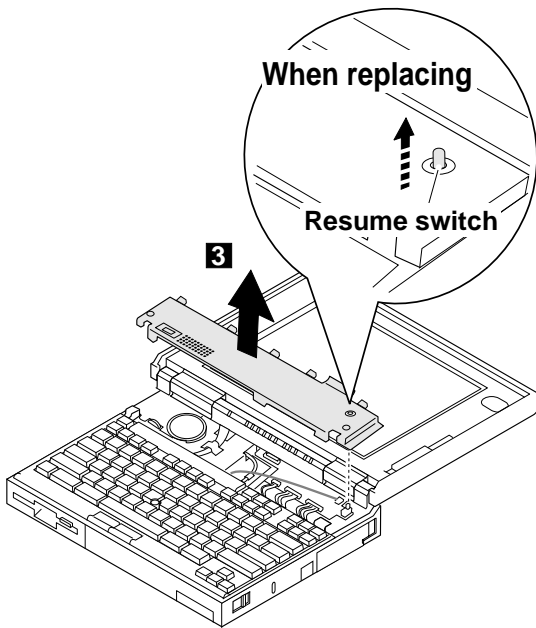
Battery Pack (1020)



Step	Screw Location (Quantity)	Length
2	Top Cover (2)	M2 x 5 mm
Note: Make sure you use the correct screws when replacing.		

Note

When replacing the top cover, be careful not to damage the resume switch. Ensure that the resume switch extends through the hole, as shown in the figure.

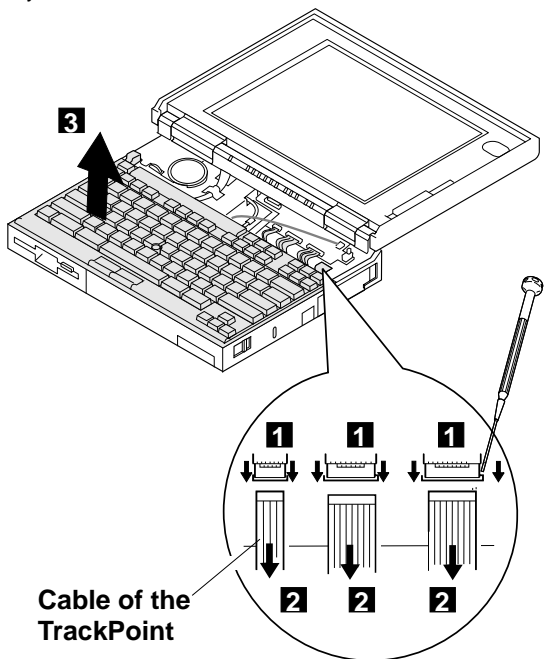


1070 Keyboard Unit

Battery Pack (1020)

Top Cover (1060)

When replacing the keyboard unit, connect the keyboard connector as shown in the figure; then replace the keyboard.



1080 LCD Assembly

Battery Pack (1020)

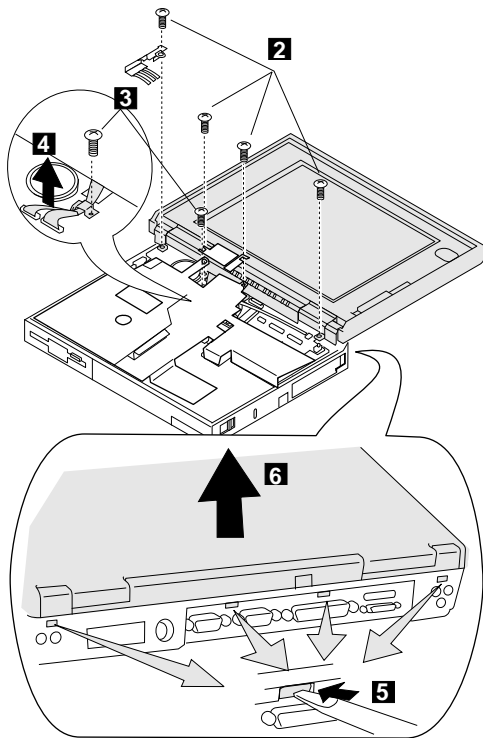
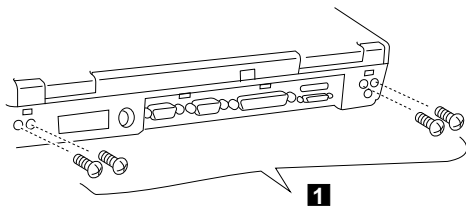
Insulator Sheet (1025)

Diskette Drive / CD-ROM Drive (1040)

Hard Disk Drive (1050)

Top Cover (1060)

Keyboard Unit (1070)



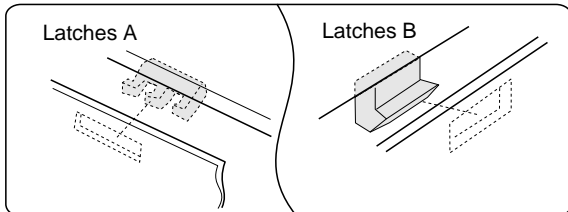
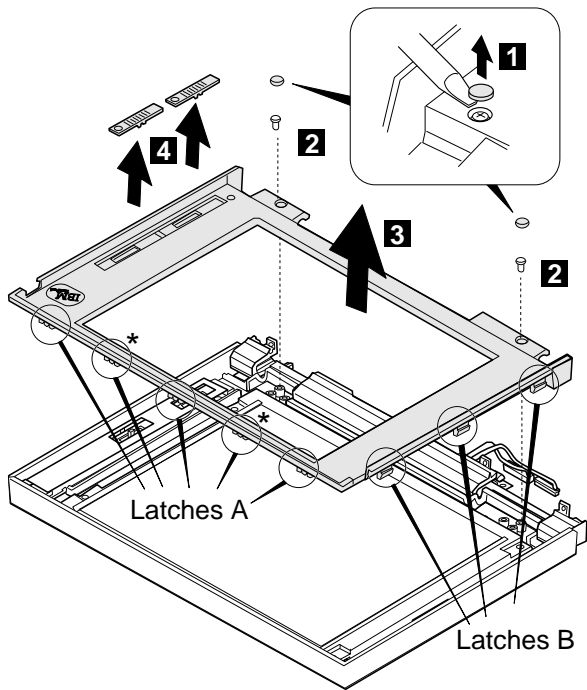
Step	Screw Location (Quantity)	Length
1	Base Cover (4)	M3 x 5 mm
2	LCD Assembly (4)	M2 x 5 mm
3	LCD Cable (1)	M3 x 4 mm

Note: Make sure you use the correct screws when replacing.

1085 LCD Panel

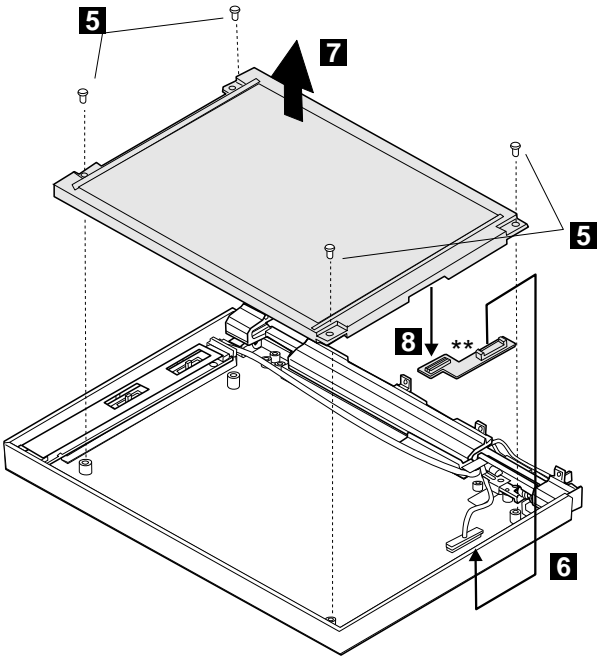
- Battery Pack (1020)
- Insulator Sheet (1025)
- Diskette Drive / CD-ROM Drive (1040)
- Hard Disk Drive (1050)
- Top Cover (1060)
- Keyboard Unit (1070)
- LCD Assembly (1080)

DSTN LCD Panel



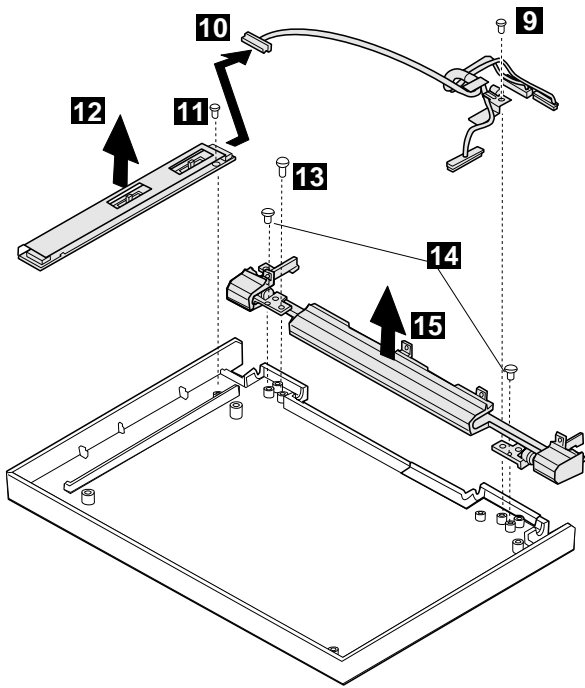
*Latches only for 11.3-inch LCDs (total 5 latches).

Step	Screw Location (Quantity)	Length
2	LCD Front Cover (2)	M3 x 6 mm
Note: Make sure you use the correct screws when replacing.		



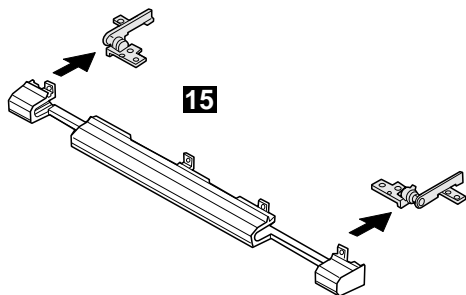
**Part only for 10.4-inch LCDs.

Step	Screw Location (Quantity)	Length
5	LCD Panel (4)	M3 x 6 mm
Note: Make sure you use the correct screws when replacing.		



Step	Screw Location (Quantity)	Length
9	LCD Cable (1)	M3 x 6 mm
11	Inverter Card (1)	ST2.9 x 4.5 mm (10.4-inch LCD) M3 x 6 mm (11.3-inch LCD)
13	Right Hinge (1)	M3 x 6 mm
14	Hinge (2)	M2 x 4 mm

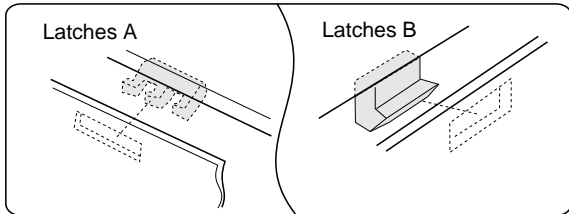
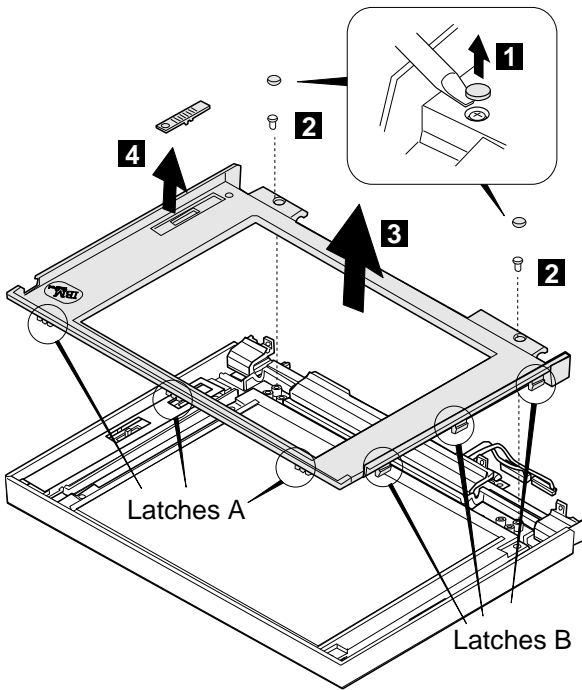
Note: Make sure you use the correct screws when replacing.



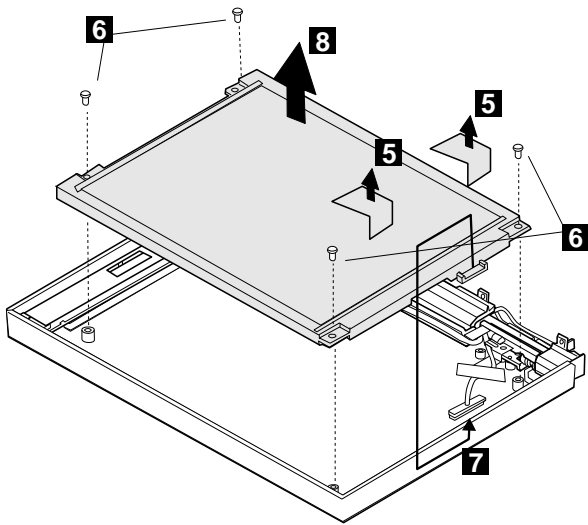
TFT 10.4-inch LCD Panel (A)

TFT 10.4 (A) P/N 46H8093 69H7947 82H8039

Note: You can replace the entire 10.4-inch TFT LCD unit (A) with the entire LCD unit (B), or vice versa. But you cannot replace parts of (A) with parts of (B), or vice versa.

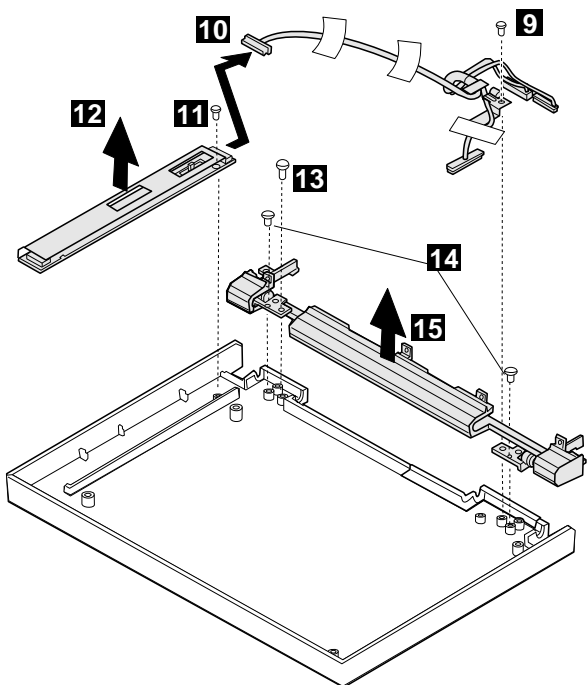


Step	Screw Location (Quantity)	Length
2	LCD Front Cover (2)	M3 x 6 mm
Note: Make sure you use the correct screws when replacing.		



Step	Screw Location (Quantity)	Length
6	LCD Panel (4)	M3 x 6 mm

Note: Make sure you use the correct screws when replacing.



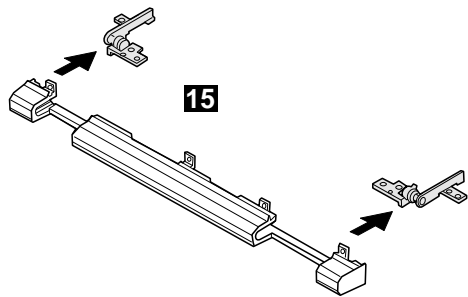
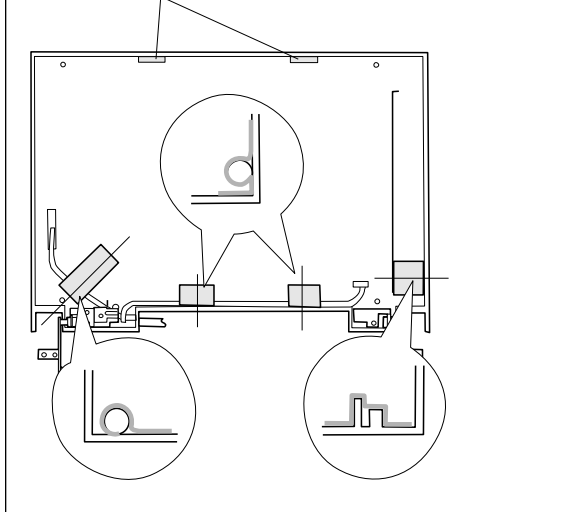
Step	Screw Location (Quantity)	Length
9	LCD Cable (1)	M3 x 6 mm
11	Inverter Card (1)	ST2.9 x 4.5 mm
13	Right Hinge (1)	M3 x 6 mm
14	Hinge (2)	M2 x 4 mm

Note: Make sure you use the correct screws when replacing.

When replacing:

When replacing the LCD cable, replace the copper tape and gasket top as shown below.

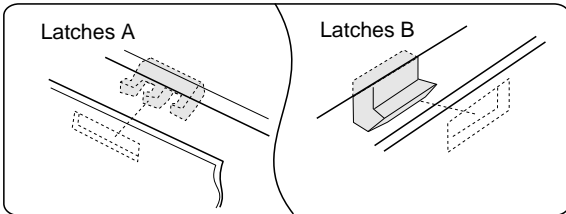
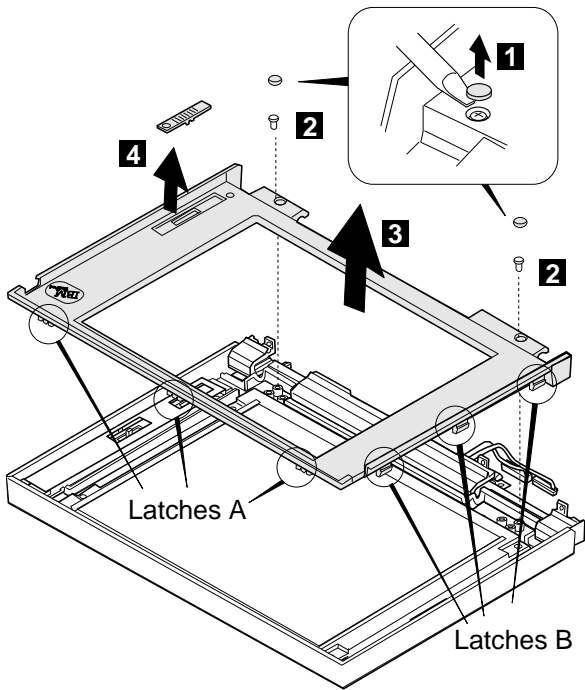
Gasket Top



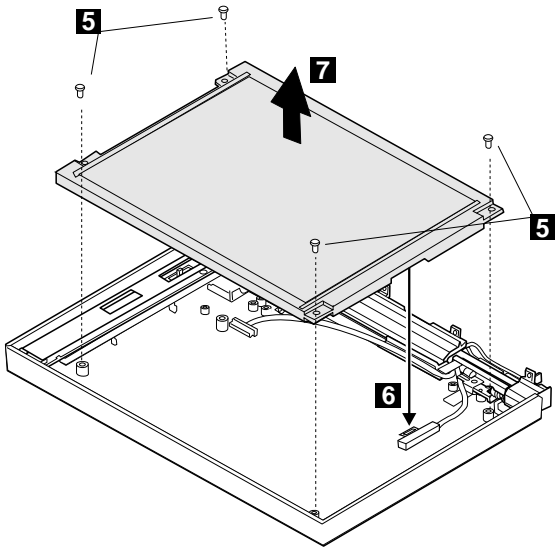
TFT 10.4-inch LCD Panel (B)

TFT 10.4 (B) P/N 83H5349 83H5350

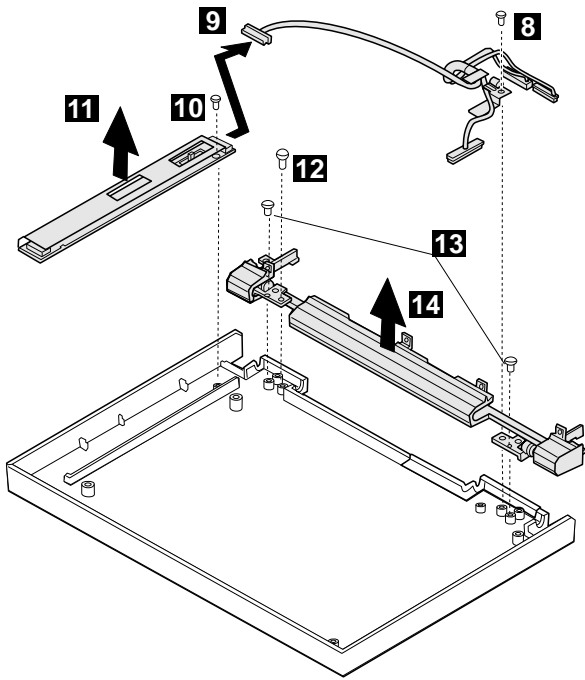
Note: You can replace the entire 10.4-inch TFT LCD unit (A) with the entire LCD unit (B), or vice versa. But you cannot replace parts of (A) with parts of (B), or vice versa.



Step	Screw Location (Quantity)	Length
2	LCD Front Cover (2)	M3 x 6 mm
Note: Make sure you use the correct screws when replacing.		

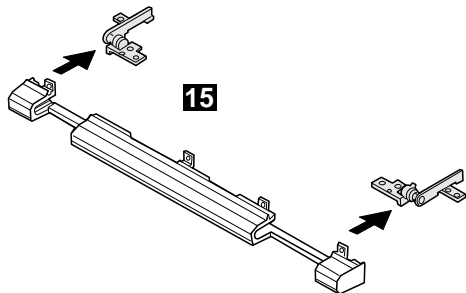


Step	Screw Location (Quantity)	Length
5	LCD Panel (4)	M3 x 6 mm
Note: Make sure you use the correct screws when replacing.		

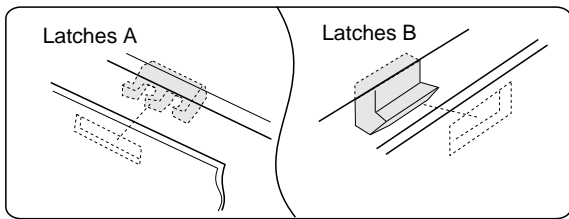
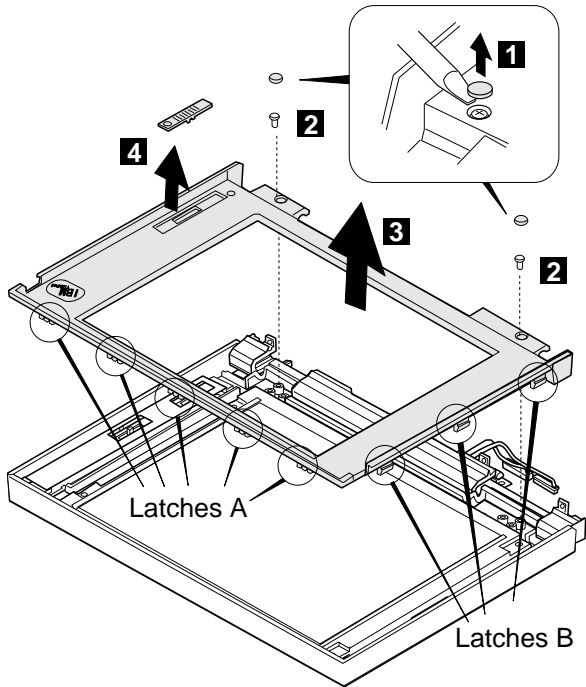


Step	Screw Location (Quantity)	Length
8	LCD Cable (1)	M3 x 6 mm
1	Inverter Card (1)	ST2.9 x 4.5 mm
12	Right Hinge (1)	M3 x 6 mm
13	Hinge (2)	M2 x 4 mm

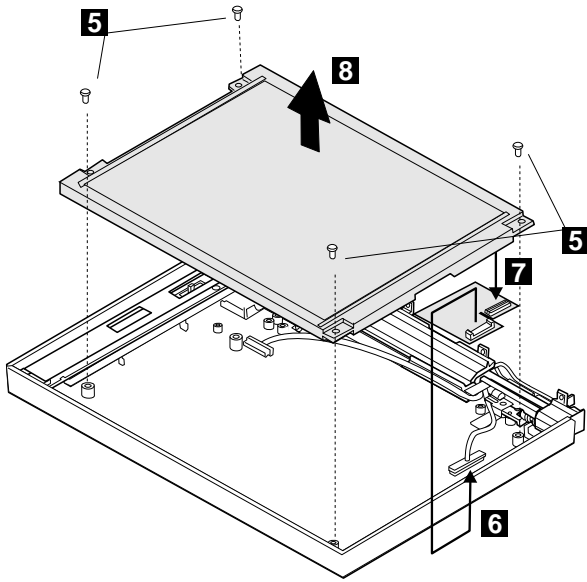
Note: Make sure you use the correct screws when replacing.



TFT 11.3-inch LCD Panel



Step	Screw Location (Quantity)	Length
2	LCD Front Cover (2)	M3 x 6 mm
Note: Make sure you use the correct screws when replacing.		

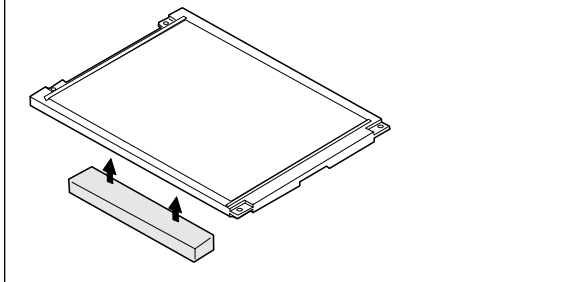


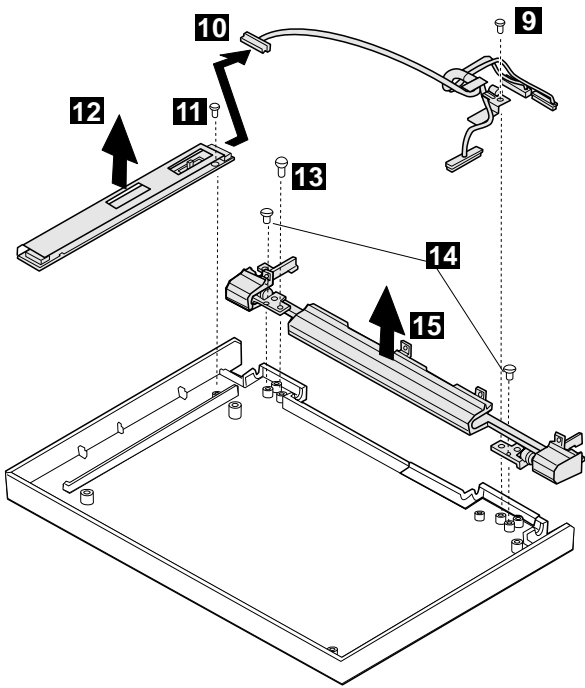
Step	Screw Location (Quantity)	Length
5	LCD Panel (4)	M3 x 6 mm

Note: Make sure you use the correct screws when replacing.

When replacing:

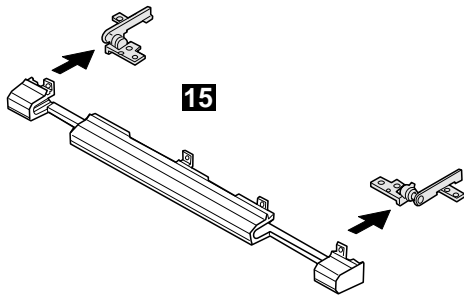
When replacing the LCD panel, glue the rear foam on the rear of the LCD as shown below.





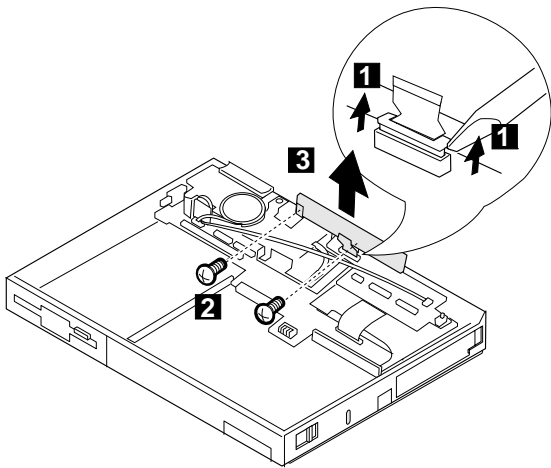
Step	Screw Location (Quantity)	Length
9	LCD Cable (1)	M3 x 6 mm
11	Inverter Card (1)	M3 x 6 mm
13	Right Hinge (1)	M3 x 6 mm
14	Hinge (2)	M2 x 4 mm

Note: Make sure you use the correct screws when replacing.



1090 Indicator Card

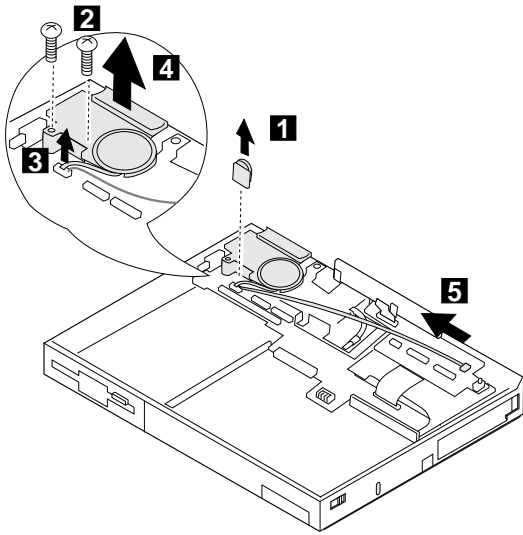
Battery Pack (1020)
Insulator Sheet (1025)
Diskette Drive / CD-ROM Drive (1040)
Hard Disk Drive (1050)
Top Cover (1060)
Keyboard Unit (1070)
LCD Assembly (1080)
LCD Panel (1085)



Step	Screw Location (Quantity)	Length
2	Indicator Card (2)	M2 x 4 mm
Note: Make sure you use the correct screws when replacing.		

1100 Volume Switch / Speaker Assembly

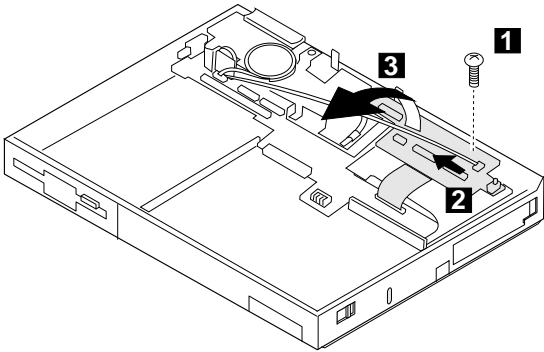
- Battery Pack (1020)
- Insulator Sheet (1025)
- Diskette Drive / CD-ROM Drive (1040)
- Hard Disk Drive (1050)
- Top Cover (1060)
- Keyboard Unit (1070)
- LCD Assembly (1080)
- LCD Panel (1085)
- Indicator Card (1090)



Step	Screw Location (Quantity)	Length
2	Speaker Assembly (1)	M2 x 4 mm
3	Speaker Assembly (2)	M2 x 5 mm
Note: Make sure you use the correct screws when replacing.		

1110 Keyboard Card / Cable

Battery Pack (1020)
Insulator Sheet (1025)
Diskette Drive / CD-ROM Drive (1040)
Hard Disk Drive (1050)
Top Cover (1060)
Keyboard Unit (1070)
LCD Assembly (1080)
LCD Panel (1085)
Indicator Card (1090)

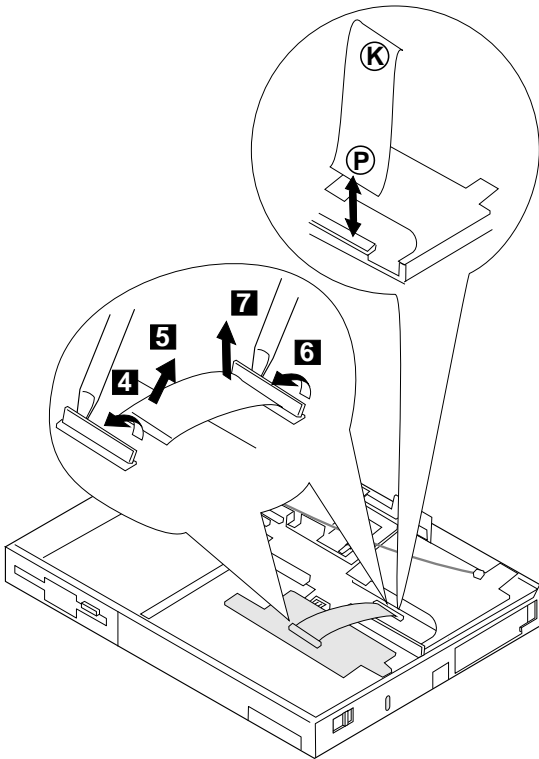


Step	Screw Location (Quantity)	Length
1	Keyboard Card (1)	M2 x 5 mm
Note: Make sure you use the correct screws when replacing.		

Note

To remove the cable, do steps 6 and 7.

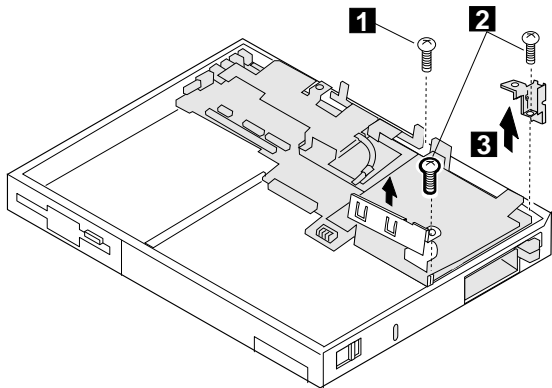
When reinstalling the cable, make sure the cable end with the letter P is installed in the system board connector. The end with the letter K should be installed in the keyboard card connector. (The letters should be facing you when you install the cable from the front of the machine.)



1120 CPU Card and System Board Card

- Battery Pack (1020)
- Insulator Sheet (1025)
- Diskette Drive / CD-ROM Drive (1040)
- Hard Disk Drive (1050)
- Top Cover (1060)
- Keyboard Unit (1070)
- LCD Assembly (1080)
- LCD Panel (1085)
- Indicator Card (1090)
- Volume Switch / Speaker (1100)
- Keyboard Card (1110)

To remove the system board and CPU Card:

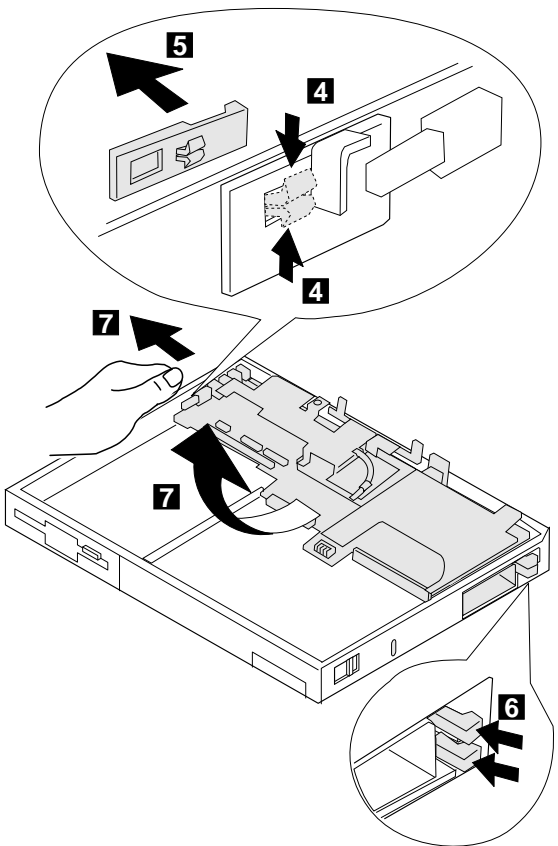


Step	Screw Location (Quantity)	Length
1	CPU Card to System Board (1)	M2 x 4 mm
2	CPU Card to System Board (2)	M2 x 5 mm

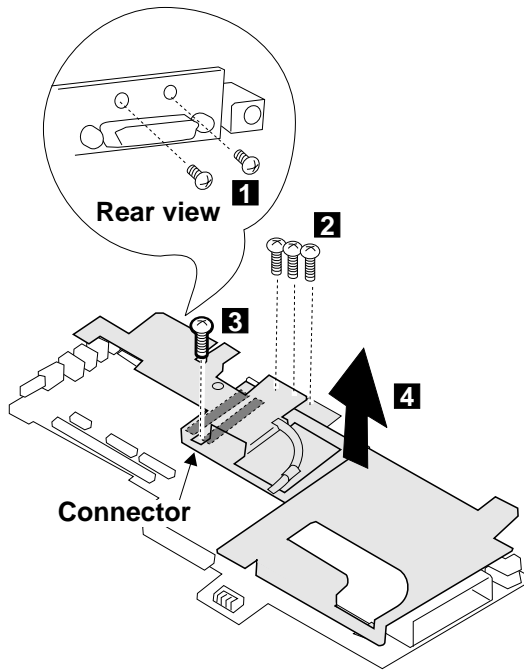
Note: Make sure you use the correct screws when replacing.

Note

The system board fits exactly in place in the base cover. Align the system board carefully when removing or reinstalling. Do not force it. Be careful not to damage the input jacks on the left side of the computer or the PCMCIA slots on the right side of the computer.



To remove the CPU card from the system board:



Be Careful

When connecting the CPU card and the system board again, use the procedures exactly as shown in the figures. Make sure that the two CPU card connectors are connected properly. If these connectors are not properly connected, the computer will not work.

Step	Screw Location (Quantity)	Length
1	System Board (2)	M2 x 4 mm
2	System Board (3)	M2 x 4 mm
3	System Board (1)	M2 x 4 mm

Note: Make sure you use the correct screws when replacing.

1130 System Board / PCMCIA Slot Assembly

Battery Pack (1020)
Insulator Sheet (1025)
Diskette Drive / CD-ROM Drive (1040)
Hard Disk Drive (1050)
Top Cover (1060)
Keyboard Unit (1070)
LCD Assembly (1080)
LCD Panel (1085)
Indicator Card (1090)
Volume Switch / Speaker (1100)
Keyboard Card (1110)
CPU Card (1120)

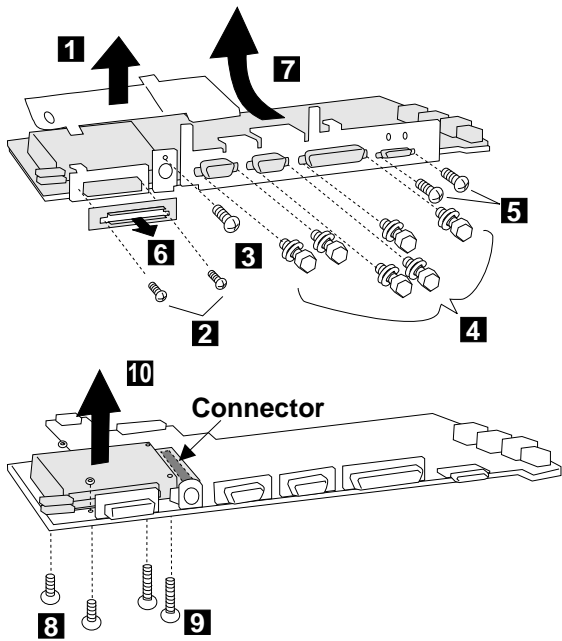
Be Careful

Connect the CPU card using the procedures exactly as shown in the figures. Make sure that the two CPU card connectors are connected properly. If these connectors are not connected, you cannot power on the computer.

Do not apply any extra force to the shaded area of the CPU card when connecting.

Notes

1. The system unit serial number must be restored when the system board is replaced. To restore the system unit serial number, select the option "Set system identification" on the maintenance diskette. The EEPROM on the system board contains the vital product data (VPD); that is, the system unit serial number, system board system number, and other computer-unique data.
2. Do not power off the computer when restoring the VPD. The system unit serial number label is attached to the base cover.
3. Before removing and replacing the system board, make sure that the PCMCIA cards are removed and the eject levers are not sticking out.
4. Do not pull the PCMCIA slot assembly while removing the system board.
5. When handling the PCMCIA slot assembly, be careful not to disassemble any part of it. The slot assembly is not solidly fixed when it is removed from the system board or the FRU.



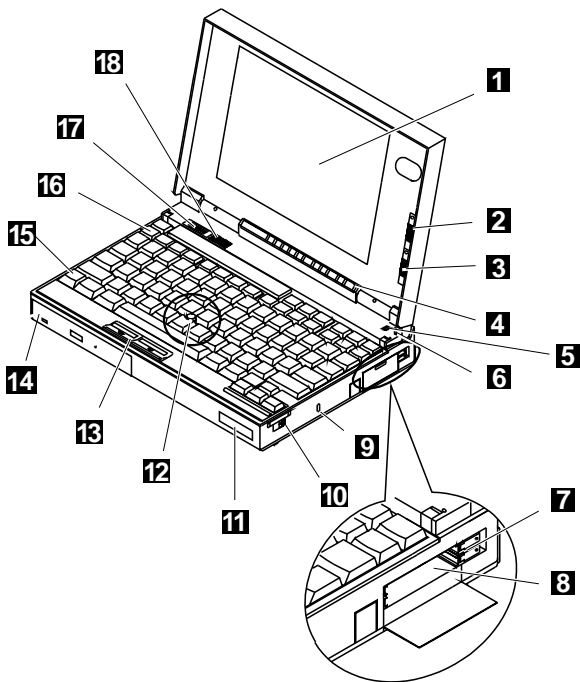
Step	Screw Location (Quantity)	Length
2	System Board (2)	M2.5 x 3 mm
3	System Board (1)	M2.5 x 4 mm
4	System Board (6)	Hex Stud
5	System Board (2)	M2 x 4 mm
8	PCMCIA Slot (2)	M2 x 4 mm and M2 nut
9	PCMCIA Slot (2)	M2 x 14 mm

Note: Make sure you use the correct screws when replacing.

Locations

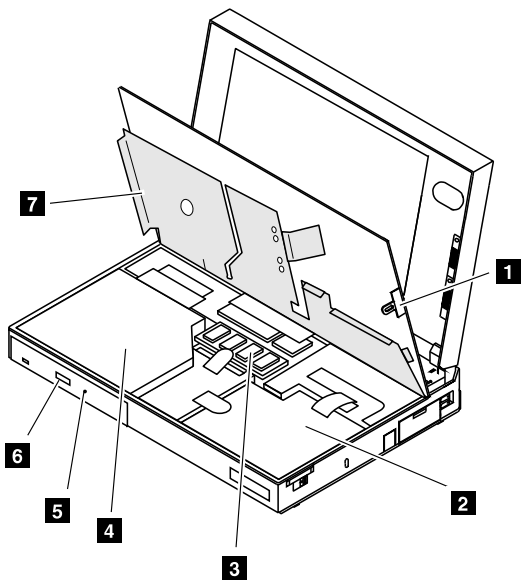
Front View

- 1 LCD
- 2 Contrast Control
- 3 Brightness Control
- 4 Indicator Panel
- 5 Built-in Microphone
- 6 LCD Suspend Switch
- 7 PC Card Eject Buttons
- 8 PCMCIA Slots
- 9 Locking Device Keyhole
- 10 Release Latches
- 11 Personalization Name Plate
- 12 TrackPoint III
- 13 Click Buttons
- 14 CD-ROM (365XD) / Diskette Drive (365X)
- 15 Fn Key
- 16 Function Keys
- 17 Speaker Volume Control
- 18 Speaker



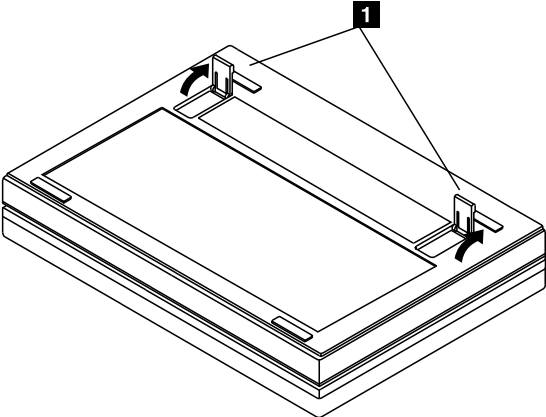
Inside View

- 1 Keyboard Lock
- 2 Battery Pack
- 3 Optional Memory Expansion Module
- 4 CD-ROM Drive (365XD) /
Diskette Drive (365X)
- 5 Mechanical CD-ROM eject (365XD)
- 6 CD-ROM Eject Button (365XD) /
FDD Bezel (365X)
- 7 Cosmetic Shield



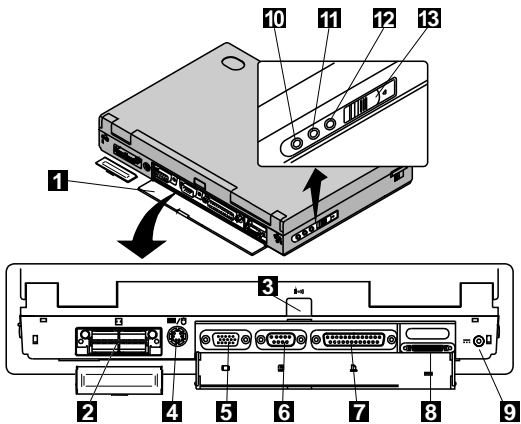
Bottom View

1 Legs



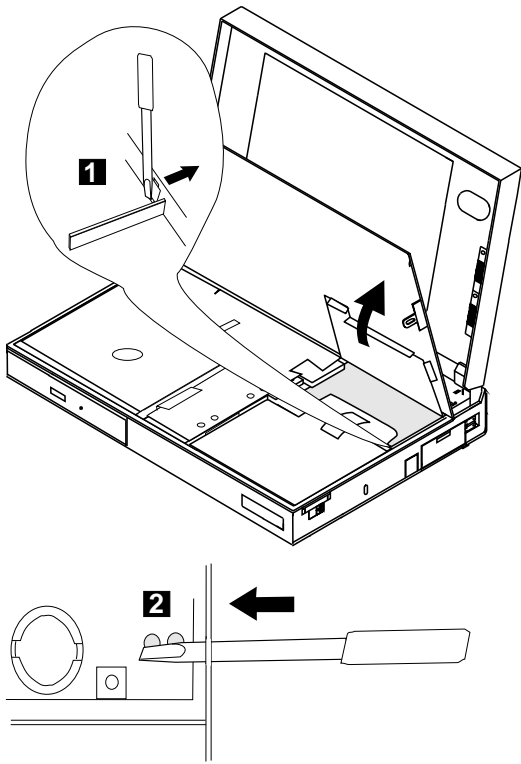
Rear View

- 1 Rear Connector Door
- 2 Connector for Port Replicator
- 3 IR Port
- 4 External Input Device Connector
- 5 External Display Connector
- 6 Serial Connector
- 7 Parallel Connector
- 8 External Diskette Drive Connector
- 9 Power Jack
- 10 Line-out/Headphone Jack
- 11 Line-in Jack
- 12 Microphone Jack
- 13 Power Switch



Power-On Password Jumper Pads

The power-on password jumper pads are found on the system board near the backup battery, as shown in the figures.



1. Push out the door at 1 .
2. See "How to Disable the Power-On Password:" on page 29 to cancel the power-on password. Apply the short across the Power-On Password Jumper Pads at 2 .

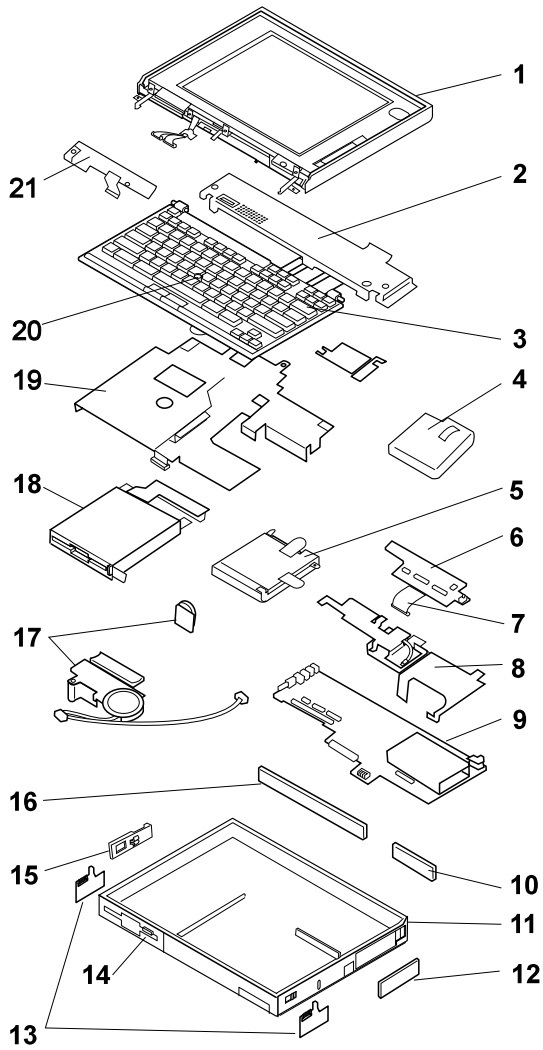
Warning

When using a metal tool to short the two jumper pads, make sure the metal tool does not touch any metal parts other than the two jumper pads.

Notes

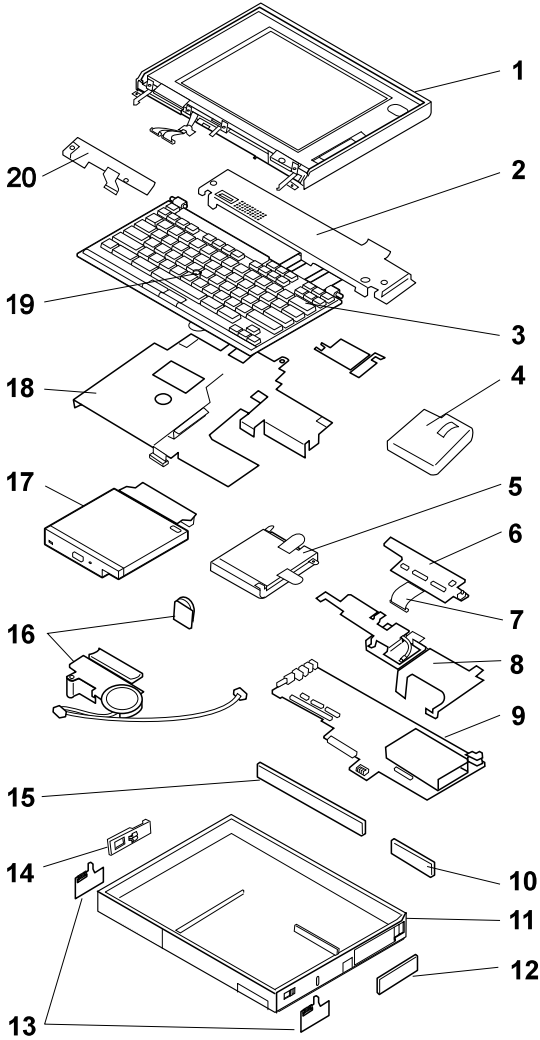
Parts Listing 365X, 365XD (2625)

Model 365X - Diskette Drive



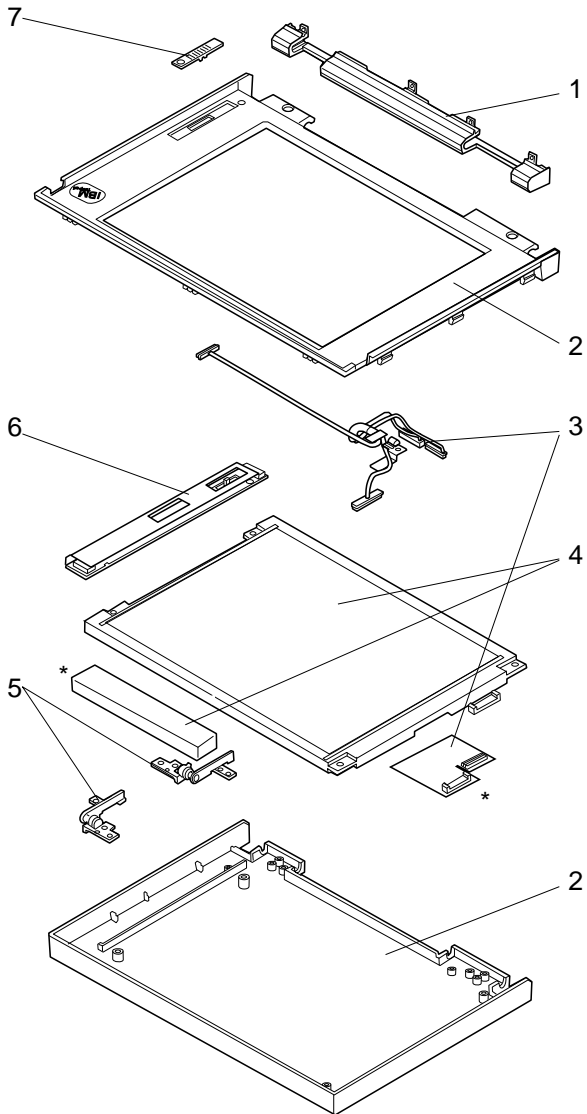
Index	System Unit (365X)	
1	LCD Panel — See page 106.	
2	Top Cover	69H7919
3	Keyboard — See page 110.	
4	Battery Pack	41H7438
5	Hard Disk Drive (720 MB)	85G8371
	Hard Disk Drive (810 MB)	39H2220
	Hard Disk Drive (1.08 GB)	39H2221
	Hard Disk Drive (1.35 GB)	73H6419
NS	Bracket Kit (HDD)	74H0238
6	Keyboard Card Assembly	69H7913
7	Miscellaneous Cable Kit: Keyboard Card to System Board	
	FDD to System Board (365X)	74H0574
8	CPU Card Assembly (P100)	69H7912
	CPU Card Assembly (P120)	74H0237
	CPU Card Assembly (P133)	82H8162
9	System Board Card Assembly with Audio	83H7117
10	Port Replicator Cap	69H7906
11	Base Cover Assembly	69H7903
12	PCMCIA Card Slot Cover	69H7904
13	Keyboard Latch (L/R)	82H8177
14	FDD Bezel	83H5275
15	Power Switch — See Misc. Base Parts	
16	Rear I/O Connector Cover	69H7905
17	Speaker/Volume/Cable Assembly	74H0573
18	Diskette Drive (2 mode)	69H7926
	Diskette Drive (3 mode; Japan)	74H0232
19	Cosmetic Shield	82H8172
20	TrackPoint III Cap set	84G6536
21	LED Indicator Card	69H7914
NS	Real-Time Clock Backup Battery	46H4132
NS	Misc. Base Parts: Cover Support Bracket, Screw Caps, Power Switch Knob, Power Switch Bracket, EMI Bracket, EMI Top Plate, System Insulator, Base Insulator, Base Right Clip	69H7916
NS	Misc. Logic Parts: CPU Spacer, CPU Heat Sink I/O Connector Bracket, Port Replicator Bracket	69H7915
NS	Foot (Tilt)	74H0571

Model 365XD - CD-ROM Drive



Index	System Unit (365XD)	
1	LCD Panel — See page 106.	
2	Top Cover	69H7919
3	Keyboard — See page 110.	
4	Battery Pack	41H7438
5	Hard Disk Drive (720 MB)	85G8371
	Hard Disk Drive (810 MB)	39H2220
	Hard Disk Drive (1.08 GB)	39H2221
	Hard Disk Drive (1.35 GB)	73H6419
NS	Bracket Kit (HDD)	74H0238
6	Keyboard Card Assembly	69H7913
7	Miscellaneous Cable Kit: Keyboard Card to System Board	
	CD-ROM to system board (365XD)	74H0574
8	CPU Card Assembly (P100)	69H7912
	CPU Card Assembly (P120)	74H0237
	CPU Card Assembly (P133)	82H8162
9	System Board Card Assembly with Audio	83H7117
10	Port Replicator Cap	69H7906
11	Base Cover Assembly	69H7903
12	PCMCIA Card Slot Cover	69H7904
13	Keyboard Latch (L/R)	82H8177
14	Power Switch — See Misc. Base Parts	
15	Rear I/O Connector Cover	69H7905
16	Speaker/Volume/Cable Assembly	74H0573
17	CD-ROM Drive (X4 Speed)	69H7925
	CD-ROM Drive (X6 Speed)	82H8160
	CD-ROM Drive (X8 Speed)	82H8173
18	Cosmetic Shield	82H8172
19	TrackPoint III Cap set	84G6536
20	LED Indicator Card	69H7914
NS	Real-Time Clock Backup Battery	46H4132
NS	Miscellaneous Base Parts: Cover Support Bracket, Screw Caps, Power Switch Knob, Power Switch Bracket, EMI Bracket, EMI Top Plate, System Insulator, Base Insulator, Base Right Clip	69H7916
NS	Miscellaneous Logic Parts: CPU Spacer, CPU Heat Sink I/O Connector Bracket, Port Replicator Bracket	69H7915
NS	Foot (Tilt)	74H0571

Model 365X/365XD - TFT LCD Panel



* Parts only for the 11.3-inch TFT.

TFT LCD FRU Parts List

10.4-inch (A) P/N 46H8093 69H7947 82H8039

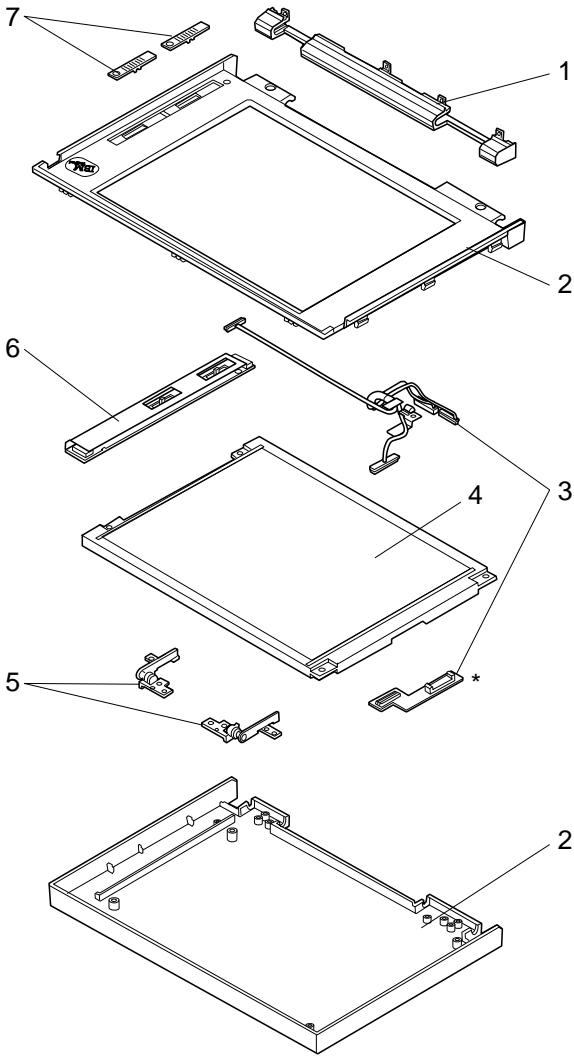
10.4-inch (B) P/N 83H5349 83H5350

Notes

1. You can distinguish the 10.4-inch TFT LCD unit (A) or (B) by the label sealed on the inside of its hinge cover assembly (1 in the parts list).
2. You can replace the entire 10.4-inch TFT LCD unit (A) with the entire LCD unit (B), or vice versa. But you cannot replace parts of (A) with parts of (B), or vice versa.
3. Model-Gxx contains only 10.4-inch (B) type.

System Unit	10.4 (A)	10.4 (B)	11.3
1 Hinge Cover Assembly			
FDD	74H0617	74H0617	74H0617
CD-ROM	74H0618	74H0618	74H0618
2 LCD Cover Kit	74H0582	83H5355	82H8165
3 LCD Cable Kit	74H0627	83H5356	82H8169
4 LCD Unit	74H0621	83H5357	82H8166
5 Hinges (Right/Left)			
– See LCD Misc. Parts			
6 Inverter Card	69H7959	83H5358	82H8167
7 Slide Knob			
– See LCD Misc. Parts			
LCD Misc. Parts:	74H0619	74H0619	74H0619
LCD Slide Knob,			
LCD Foam Support,			
Right Hinge,			
Left Hinge,			
Cable Clamp,			
Back Gasket,			
Top Gasket,			
Copper TFT Tape,			
Rubber Lid,			
Front Logo,			
Rear Logo			

Model 365X/365XD - DSTN LCD Panel



* Part only for the 10.4-inch LCDs.

DSTN LCD FRU Parts List

10.4-inch DSTN LCD

<i>Index</i>	<i>System Unit</i>	
1	Hinge Cover Assembly FDD	74H0617
	Hinge Cover Assembly CD-ROM	74H0618
2	LCD Cover Kit	74H0581
3	LCD Cable Kit	74H0626
4	LCD Unit	74H0620
5	Hinges (Right/Left) — See LCD Misc. Parts	
6	Inverter Card	69H7958
7	Slide Knob — See LCD Misc. Parts	

11.3-inch DSTN LCD

<i>Index</i>	<i>System Unit</i>	
1	Hinge Cover Assembly FDD	74H0617
	Hinge Cover Assembly CD-ROM	74H0618
2	LCD Cover Kit	74H0583
3	LCD Cable Kit	74H0628
4	LCD Unit	74H0622
5	Hinges (Right/Left) — See LCD Misc. Parts	
6	Inverter Card	69H7961
7	Slide Knob — See LCD Misc. Parts	

LCD Miscellaneous Parts

LCD Slide Knob, LCD Foam Support, Right Hinge, Left Hinge, Cable Clamp, Back Gasket, Top Gasket, Copper TFT Tape, Rubber Lid, Front Logo, Rear Logo	74H0619
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Keyboard Unit

Arabic	42H3936
Belgian	42H3937
Canadian French	42H3938
Czeck	73H7241
Danish	42H3939
Dutch	42H3940
French	42H3942
German	42H3943
Greek	42H3944
Hungary	73H7242
Hebrew	42H3945
Italian	42H3946
Japanese	42H3947
Latin Spanish	42H3948
Norwegian	42H3949
Poland	73H7243
Portuguese	42H3950
Russian	42H3956
Spanish	42H3951
Slovenia /Croatia / Bosnia	73H7244
Swedish / Finnish	42H3941
Swiss	75H7562
Turkish	42H3954
U.K. English	42H3955
U.S. English	41H9789

Common/Option Parts List

Miscellaneous Parts

Screw Kit 74H0229

Includes (Type) (Quantity):

- M2 x 4 (Bind Head) (15)
- M2 x 5 (Pan Head) (11)
- M2 x 4 with washer (Pan Head) (2)
- M2 x 8 (Pan Head) (2)
- M2.5 x 4 (Bind Head) (4)
- M2.5 x 3 (3.5D Pan Head) (2)
- M2.5 x 4 with washer (Bind Head) (3)
- M3 x 3 (Cross Slotted Pan Head) (4)
- M3 x 4 (Pan Head) (2)
- M3 x 4 (Flat Head) (4)
- M3 x 6 (Pan Head) (6)
- M3 x 6 with washer (Pan Head) (2)
- Hex Stud M2.5 Short length (6)
- Screw ST2.9 x 4.5 (Pan Head) (1)
- M2 x 5 (Bind Head) (4)
- M2 x 5 (Cross Slotted Pan Head) (2)
- M3 x 5 (Pan Head) (6)

Options

Notes:

1. When you replace the AC Adapter with a new one, use the one for the country where the computer is used, even if the computer is from different country.
2. The warranty for the system unit does not apply to all options.

720MB Hard Disk Drive Assembly	85G8371
810MB Hard Disk Drive Assembly	39H2220
810MB Hard Disk Drive Assembly	07H0392
1.08GB Hard Disk Drive Assembly	39H2221
1.35GB Hard Disk Drive Assembly	73H6419
2.1GB Hard Disk Drive Assembly	73H6427
AC Adapter	
35W Universal	85G6698
35W Japan only	85G6700
Slim AC Adapter	
3 Prong	85G6736
2 Prong	85G6738
Port Replicator Base Assembly	41H7457
Port Replicator Cable Cover	41H7458
Mini Replicator Assembly	75H7528
DIMM 8MB	42H2767
DIMM 16MB	42H2768
DIMM 32MB	42H2769
External Diskette Drive (2 mode)	10H4056
External Diskette Drive (3 mode; Japan)	10H4055
External Diskette Drive Cable	74H0219
Battery Pack	41H7438
CD-ROM Drive (x4 speed)	69H7925
CD-ROM Drive (x6 speed)	82H8160
CD-ROM Drive (x8 speed)	82H8173

Numeric Keypad

Belgian	95F5741
Canadian French	95F5466
Danish	95F5467
Dutch	95F5467
French	95F6313
German	95F6314
Greek	95F5467
Hebrew	95F5741
Icelandic	95F5467
Italian	95F6316
Japanese	79F6401
Norwegian	95F5467
Spanish	95F6315
Swedish / Finnish	95F5468
Swiss / French	95F5711
Swiss / German	95F5715
Turkish	95F5467
U.K. English	95F5741
U.S. English	95F5741

Black Keypad

French	84G6286
German	84G6280
Italian	84G6292
Swedish	84G6304
U.K. English	84G6298
Norway	84G6310
U.S. English	84G2530

Black Keyboard

French	84G6285
German	84G6279
Italian	84G6291
Swedish	84G6303
U.K. English	84G6297
Norway	84G6309
U.S. English	84G2529

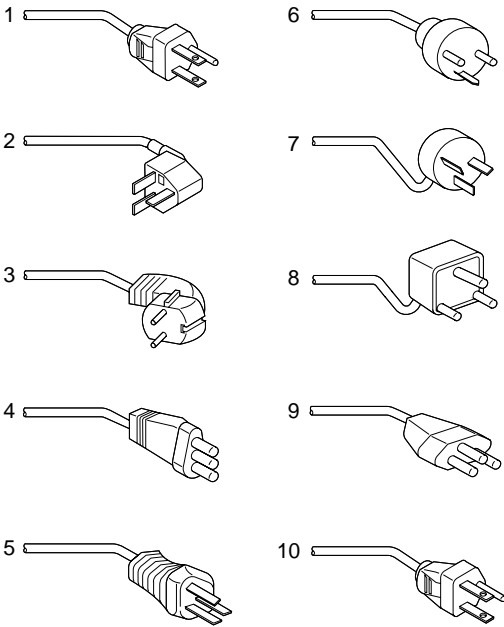
Accessories

Keyboard/Mouse Cable	54G0444
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Tools

Tri-Connector Wrap Plug	72X8546
PC Test Card	35G4703
Screwdriver Kit	95F3598
ThinkPad 750Ce Hardware Maintenance Diskette (This diskette is used for 365X and 365XD also.)	82G3891

Power Cords



Warning:

Use the power cord certified for your country.

1	Colombia, U.S., Venezuela	25H2207
	Japan, 2-pin	85G6665
2	Hong Kong, Singapore, U.K.	25H2215
3	France, Germany, Spain	25H2209
4	Italy	25H2223
5	Australia, New Zealand	25H2205
6	Denmark	25H2211
7	Israel	25H2225
8	Bangladesh, Pakistan, Sri Lanka, South Africa	25H2213
9	Switzerland	25H2221
10	Thailand	25H2219

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Read This First

Before you go to the checkout guide, be sure to read this section.

Important Notes

Only certified trained personnel should service the computer.

Read FRU service procedures before replacing any FRUs.

Be extremely careful during write operations such as copying, saving, or formatting. Drives in the computer that you are servicing might have been rearranged or the drive startup sequence might have been altered. If you select an incorrect drive, data or programs can be written over.

Replace FRUs only for the correct model.

When you replace the FRU, make sure the model of the machine and FRU part number are correct by referring to the part list.

FRUs should not be replaced because of a single, un-reproducible failure. Single failures can occur from a variety of reasons that have nothing to do with a hardware defect such as: cosmic radiation, electrostatic discharge, or software errors. FRU replacement should only be considered when a recurring problem exists. If this is suspected, clear the error log and run the test again. Do not replace any FRUs if log errors do not reappear.

Be careful not to replace a non-defective FRU.

How to Use Error Messages: Use the error codes displayed on the screen to diagnose failures. If more than one error code is displayed, begin the diagnosis with the first error code. The cause of the first error code can result in false error codes being displayed. If no error code is displayed, see if the error symptom is listed in the "Symptom-to-FRU Index" on page 132.

Port Replicator Problems: If you suspect a problem with the Port Replicator, see "Port Replicator Checkout" on page 128.

How to Diagnose Multiple FRUs: When the adapter or device has more than one FRU, the error code could be caused by either FRU. Before replacing multiple FRUs, try removing or exchanging each FRU, one by one in the designated sequence, to see if the symptoms change.

What to Do First: The servicer must include the following in the parts exchange form or parts return form that is attached to the returned FRU.

- ___ 1. Name and phone number of servicer.
- ___ 2. Date of service.
- ___ 3. Date when part failed.
- ___ 4. Date of purchase.
- ___ 5. Failure symptoms, error codes appearing on display, and beep symptoms.
- ___ 6. Procedure index and page number in which failing FRU was detected.
- ___ 7. Failing FRU name and part number.
- ___ 8. Machine type, model number, and serial number.
- ___ 9. Customer's name and address.

Before checking problems with the computer, determine whether or not the damage applies the warranty by referring to the following:

Warranty Note

During the warranty period, the customer may be responsible for repair costs if the computer damage was caused by misuse, accident, modification, unsuitable physical or operating environment, or improper maintenance by the customer. The following list provides some common items that are not covered under warranty and some symptoms that may indicate the system was subjected to stresses beyond normal use:

- LCD panel cracked by applying excessive force or by being dropped.
- Scratched (cosmetic) parts.
- Cracked or broken plastic parts, broken latches, broken pins, or broken connectors caused by excessive force.
- Damage caused by liquid spilled into the system.
- Damage caused by improperly inserting a PCMCIA card or installation of an incompatible card.
- Damage caused by foreign material in the FDD.
- Diskette drive damage caused by pressing the diskette drive cover or inserting diskettes with multiple labels.
- Damaged or bent diskette eject button.
- Fuses blown by attaching a non-supported device.
- Forgotten computer password, making computer unusable.

If the following symptoms are present, they may indicate damage caused by non-warranted activity:

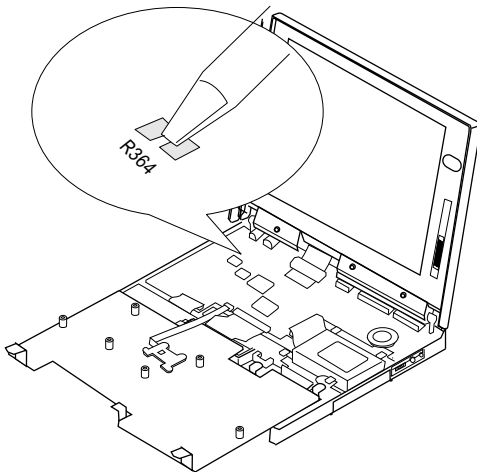
Missing parts may be a symptom of unauthorized service or modification.

HDD spindles can become noisy if subjected to excessive force or by being dropped.

I9990303 errors can be caused by exposure to strong magnetic fields.

How to Disable the Power-On Password

1. Power off the computer.
2. Remove the frame (see "1040 Frame" on page 154).
3. Position the keyboard as shown in the figure.
4. Jumper the two password jumper pads located on the system board.



5. Power on the computer to clear the password.
6. Replace the keyboard and the frame.

Note

When replacing the frame, make sure the frame fits correctly in place. If not, the click buttons of the TrackPoint III cannot be pressed. (See the note in "1050 Keyboard Unit" on page 156.)

7. Replace the screws.
8. Power on the computer and wait until the POST ends.
9. Verify that the password prompt does not appear.

To reactivate the password, set the password again.

Power Shutdown Switch: The power shutdown switch resets the system regardless of the microcode status and forces the power off. Use this push button to power-off when power is not completely off or the microcode is in a hung state.

See “Bottom View” on page 98 for the power shutdown switch.

Checkout Guide

Use the following procedure as a guide for computer problems.

Note

The diagnostic tests are intended to test only IBM products. Non-IBM products, prototype cards, or modified options can give false errors and invalid system responses.

1. Obtain the failing symptoms in as much detail as possible.
2. Verify the symptoms by attempting to recreate the failure by running the diagnostic test or by repeating the same operation.

Note

To run the diagnostics, refer to "How to Run the Diagnostics" on page 145.

3. Use the following table with the verified symptom to determine which page to go to. Search the symptoms column and find the description that best matches your symptom; then go to the page shown in the "Go to" column.

Symptoms (Verified)	Go to
Power failure. (The power indicator does not go on or stay on.)	"Power Systems Checkout" on page 125.
POST does not complete. No beeps/error code are indicated.	"Symptom-to-FRU Index" on page 132, and then use the No Beep Symptoms table.
POST beeps, but no error codes are displayed.	"Symptom-to-FRU Index" on page 132, and then use the Beep Symptoms table.
POST detected an error and displayed numeric error codes.	"Symptom-to-FRU Index" on page 132, and then use the Numeric Error Codes table.
The diagnostic test detected an error and displayed an FRU code.	"How to Run the Diagnostics" on page 145.
The configuration is not the same as the installed devices.	"Checking the Installed Devices List" on page 146.

Symptoms (Verified)	Go to
Other symptoms (such as LCD display problems).	"Symptom-to-FRU Index" on page 132, and then use the Other Symptoms table.
Symptoms cannot be recreated. (Intermittent problems.)	Use the customer reported symptoms and go to "Symptom-to-FRU Index" on page 132.

Memory Checkout

DIMM cards are available for increasing memory capacity.

DIMM	Displayed Value
No DIMM installed	7808KB
8MB	16000KB
16MB	24192KB
32MB	40576KB

Memory errors might stop system operations, show error messages on the screen, or hang the system.

Use the following procedure to isolate memory problems.

Note

Make sure that the DIMM card is fully installed into the connector. A loose connection can cause an error.

1. Power off the computer and remove the DIMM card from its slot (if installed).
2. Press and hold the F1 key; then power on the computer. Hold the F1 key down until the Easy-Setup screen appears.
3. Select **Test** and press Enter.
4. Select **Memory** and press Enter to run the memory test on base memory. If an error appears, replace the system board.
5. Power off the computer and reinstall the DIMM card; then power on the computer. Verify the memory size; then test the memory. If an error appears, replace the DIMM card.

If memory problems occur intermittently, use the loop option to repeat the test. When the test detects an error, an error log is printed on the printer connected to the parallel port. See "Error Log" on page 146 for more information.

System Programs in Flash Memory: System setup programs and diagnostic tests are stored in flash memory.

Flash Memory Update: A flash memory update is required for the following conditions:

- New versions of system programs.
- New features or options are added.

To update the flash memory, do the following:

1. Get the appropriate diskette containing the update.
2. Insert the **System Program Service Diskette** into drive A and power on the computer.
3. Select **Update system programs** from the menu.

System Board Checkout

The processing functions are performed by the system board. When a numeric code calls the system board as a FRU, use the following procedure to isolate the problem.

1. Run the system board test to verify the symptom.
This test verifies the system board. If no error is detected, return to "Checkout Guide" on page 121.
2. If FRU code 10 appears, replace the system board.
3. Rerun the test to verify the fix.

If above procedure does not correct the problem, go to "Undetermined Problems" on page 143.

Keyboard/Auxiliary Input Device Checkout

Remove the external keyboard if the internal keyboard is to be tested.

If the internal keyboard does not work or an unexpected character appears, make sure that the flexible cable extending from the keyboard is correctly seated in the connector on the system board.

If the keyboard cable connection is correct, run the **Keyboard Test** by doing the following:

1. Go to the diagnostic menu screen by pressing **Ctrl+A** in the Easy-Setup screen.
2. Press **Ctrl+K**; a layout of the keyboard appears on the screen.
3. Check that when each key is pressed, the key's position on the keyboard layout on the screen changes to a black square.

Note

When a Fn key is pressed, a black square briefly appears.

If the tests detect a keyboard problem, do the following one at a time to correct the problem. Do not replace a non-defective FRU.

- Reseat the keyboard cable.
- Replace the keyboard.

Replace the system board.

The following auxiliary input devices are supported for this computer.

- Numeric keypad
- Mouse (PS/2 compatible)
- External keyboard (with keyboard/mouse cable)

If any of the above devices do not work, reseal the cable connector and repeat the failing operation.

If the problem does not occur again, recheck the connector.

If the problem is not corrected, replace the device, and then the system board.

TrackPoint III Checkout

If the TrackPoint III will not work, check the configuration in the ThinkPad Features program. If the configuration of the TrackPoint III is disabled, select **Enable** to enable it.

If this does not correct the TrackPoint III problem, continue with the following.

The TrackPoint III does automatic compensations to adjust the pointer sensor. During this process, the pointer moves on the screen automatically for a short time. This self-acting pointer movement can occur when a slight, steady pressure is applied to the TrackPoint III pointer while the computer is powered on or while the system is running, or when re-adjustment is required because the temperature has exceeded its normal temperature range. This symptom does not indicate a hardware problem. No service actions are necessary if the pointer movement stops in a short period of time.

If a click button problem or pointing stick problem occurs, do the following:

1. Go to the Easy-Setup screen.
2. Select an item with the pointing stick.
3. Press either the left or right click button.
4. Verify that both buttons work correctly.

If either the pointing stick or the click button do not work, do the following actions one at a time to correct the problem. Do not replace a non-defective FRU.

- Reseat the keyboard cables.
- Replace the keyboard.
- Replace the system board.

Diskette Drive Test

Do the following to isolate the problem to a controller, drive, or diskette. A scratch, write enabled, non-defective 2HD diskette is required.

FDD-1 represents external diskette drive attached through the external diskette drive connector. FDD-2 represents the port replicator.

Warning: Make sure that the diskette does not have more than one label attached to it. Multiple labels can cause damage to the drive or can cause the drive to fail.

Do the following to select the test device:

1. Select the advanced diagnostics mode and select **Tool**; then select the **FDD-1** or **FDD-2** icon and press the spacebar. A mark appears next to the selected icon. Insert the **blank** diskette when instructed.
2. Run the diskette drive test.
3. If the controller test detects an error, FRU code 10 appears. Replace the system board.
4. If the controller test runs without errors, the drive read/write tests start automatically.
5. If the drive test detects an error, FRU code 50 for FDD-1 or 51 for FDD-2 appears. If the diskette itself is known to be good, replace the drive.
6. If FDD-2 test detects an error, move the drive to the computer's diskette drive connector directly, if possible, and test it again as FDD-1.

If no errors occur in the FDD-1 position, the drive is not defective. Go to "Port Replicator Checkout" on page 128 to isolate the replicator problem.

Status Indicator Checkout

If an LED problem occurs, do the following:

1. Power off the computer
2. Power on the computer
3. All the LEDs in the indicator panel turn on for a moment soon after the computer is powered-on. Make sure that all LEDs turn on.

If the problems remains, replace the system board.

Power Systems Checkout

To verify the symptom of the problem, power on the computer using each of the power sources as follows.

1. Remove the battery pack and diskette drive.
2. Connect the AC Adapter and check that power is supplied.
3. Disconnect the AC Adapter and install the charged battery pack; then check that power is supplied by the battery pack.

If you suspect a power problem, see the appropriate power supply check listed below.

"Checking the AC Adapter" on page 126.

"Checking Operational Charging" on page 126.

"Checking the Battery Pack" on page 127.

“Checking the Backup Battery” on page 128.

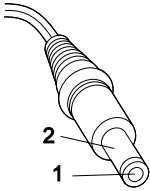
Checking the AC Adapter: You are here because the computer fails only when the AC Adapter is used.

If the power problem occurs only when the port replicator is used, replace the replicator.

If the power-on indicator does not turn on, check the power cord of the AC Adapter for correct continuity and installation.

If the operational charge does not work, go to “Checking Operational Charging.”

1. Unplug the AC Adapter cable from the computer and measure the output voltage at the plug of the AC Adapter cable. See the following figure.



(16 - 10 V)

Pin	Voltage (V dc)
1	+14.5 to +17.0
2	Ground

Replace the system board.

If the problem is not corrected, go to “Undetermined Problems” on page 143.

If the voltage is not correct, go to the next step.

2. Unplug the AC Adapter cable from the ac power outlet and wait five minutes or longer to allow the over-voltage protection circuit to be fully discharged and initialized.
3. Plug the AC Adapter cable into the ac power outlet.
4. Measure the output voltage of the AC Adapter.
5. If the voltage is still not correct, replace the AC Adapter.

Note

An audible noise from the AC Adapter does not always indicate a defective adapter.

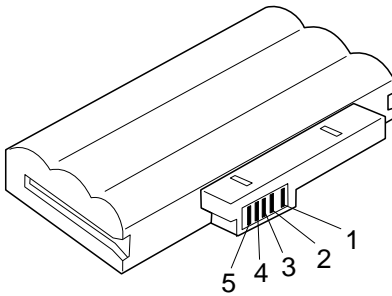
Checking Operational Charging: To check operational charging, use a discharged battery pack or a battery pack that has less than 50% of the total power remaining when installed in the computer.

Perform operational charging. If the battery status indicator does not turn on, remove the battery pack and leave it to return to room temperature. Reinstall the battery pack. If the charge indicator still does not turn on, replace the battery pack.

Checking the Battery Pack: Battery charging will not start until the Fuel-Gauge shows that less than 95% of the total power remains; with this condition the battery pack will charge to 100% of its capacity. This protects the battery pack from being over-charged or having a shortened life.

Do the following:

1. Power off the computer.
2. Remove the battery pack and measure the voltage between battery terminals 1 (+) and 4 (-). See the following figure.



Terminal	Voltage (V dc) / Signal
1	+0 to +13.5
2	Send
3	Thermal
4	Ground (-)
5	Select

Note

Signal lines, not used in these steps, are used for communication between the system and the battery.

3. If the voltage is less than +11.0 V dc, the battery pack has been discharged. Recharge the battery pack.
If the voltage is still less than +11.0 V dc after recharging, replace the battery.

Note

If the voltage of the battery pack is 0 V, it is not defective.

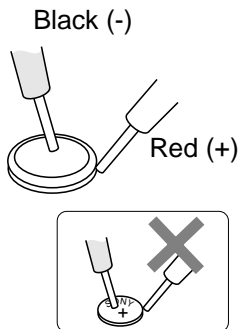
- If the voltage is more than +11.0 V dc, measure the resistance between battery terminals 3 and 4. The resistance must be 4 to 30 K ohm.

If the resistance is not correct, replace the battery pack. If the resistance is correct, replace the system board.

Checking the Backup Battery

- Power off the computer and unplug the AC Adapter from the computer.
- Turn the computer upside down.
- Remove the DIMM cover and backup battery (see "1010 Backup Battery" on page 151).
- Measure the voltage of the backup battery. See the following figure.

Note: Be careful not to measure the wrong side of the backup battery.



Wire	Voltage (V dc)
Red	+2.5 to +3.7
Black	Ground

If the voltage is correct, replace the system board.
 If the voltage is not correct, the backup battery has been discharged. Replace the backup battery.
 If the backup battery discharges quickly after replacement, replace the system board.

Port Replicator Checkout

Use the following procedure to isolate a port replicator problem. A port replicator attaches to the system expansion connector at the bottom of the computer.

- Power off the computer.
- Remove the failing devices from the replicator.
- Unplug the AC adapter from the replicator, if attached.
- Remove the port replicator from the computer.

5. Reconnect the failing device directly to the computer. (If another device already connected to the computer, remove it first.)
6. Go to the “How to Run the Diagnostics” on page 145 and run the diagnostics.
7. If the advanced diagnostic device test does not find an error, suspect a problem with the port replicator of the system expansion bus.
8. Power off the computer and reconnect the port replicator.
9. Power on the computer and run the following advanced diagnostic tests:
 - Serial port test with the wrap plug installed on the replicator.
 - Parallel port test with the wrap plug installed on the replicator.
 - FDD-2 device test on the failing device with scratch diskette.
10. If diagnostic errors appear, replace the replicator or diskette drive attachment unit.
If the problem remains after the replacement, replace the system board.
11. If power problems appear only when using the replicator, replace the replicator.

Power Management Features

Three power management modes are provided by the computer to reduce power consumption and prolong battery power.

Standby Mode: When in standby mode the following occurs:

- The LCD backlight turns off.
- The hard disk motor stops.

Events that cause the computer to enter standby mode:

- Standby requested by the Fn key. (Fn+F3)
- No activity under **auto-standby** enabled by the ThinkPad Features program.

Events that cause the computer to exit or resume standby mode:

- (Resume) Any key operation.

Suspend Mode: When in suspend mode, the following, in addition to the four actions of standby mode, occur:

- The LCD is powered-off.
- The hard disk is powered-off.
- The CPU is stopped.

Notes

1. In the ThinkPad Features Program, the computer can be set to "Will not suspend even if LCD is closed."
2. When the computer is powered with ac power and is used with one of the communication PC cards, the computer enters *standby mode*; the PC card and application program remain active.
3. The computer cannot enter suspend mode while a communication link is running.

Events that cause the computer to enter suspend mode:

Suspend mode is requested by the Fn key (Fn+F4).
The LCD is closed.

The specified time has elapsed from the last operation with the keyboard, mouse, hard disk drive, parallel connector, or diskette drive; or the AC Adapter is plugged in. The time is specified by **Suspend Timer** in the ThinkPad Features program.
The battery condition is low. The battery power indicator blinks orange.

Either the *PS2 OFF* or *PS2 SUSpend* command is set in the ThinkPad Features program.

Events that cause the computer to exit or resume suspend mode:

(Resume) The LCD is opened.

(Resume) The real time clock alarm is signaled.

(Resume) The ring indicator (RI) is signaled by a serial or PCMCIA device.

(Resume) The Fn key is pressed.

(Resume) An external keyboard key is pressed while operating with ac power.

(Exit) Timer conditions are satisfied for entering hibernation mode.

Hibernation Mode: When in hibernation mode, the following occurs:

The system status, RAM, VRAM, and setup data are stored on the hard disk.

The system is powered-off.

Note

The computer cannot enter hibernation mode when the computer is powered with ac power and a communication PC card is used.

Events that cause the computer to enter hibernation mode:

Hibernation mode is requested by the Fn key (Fn+F12).

Timer conditions are satisfied in suspend mode.

A critical low battery condition occurs.

The *PS2 HIB* command is set in the ThinkPad Features program.

Event that causes the computer to exit hibernation mode.

The power-on switch is operated.

When power is turned on, the hibernation history in the boot record on the hard disk is recognized and system status is restored from the hard disk to resume operation.

Symptom-to-FRU Index

The Symptom-to-FRU Index lists the symptoms and errors and the possible causes. The most likely cause is listed first.

Note

Perform the FRU replacement or actions in the sequence shown in the "FRU/Action" columns. If a FRU did not solve the problem, put the original part back in the computer. Do not replace a non-defective FRU.

This index can also be used to help you decide which FRUs to have available when servicing a computer.

Numeric error codes show the errors detected in POST or system operation. In the following error codes, **X** can be any number.

If no codes are available, use narrative symptoms.

If the symptom is not listed, go to "Undetermined Problems" on page 143.

Note

For IBM devices not supported by diagnostic codes in the ThinkPad notebook computers, see the manual for that device.

Numeric Error Codes

Symptom / Error	FRU / Action in Sequence
10X 101: Interrupt failure. 102: Timer failure. 103: Timer interrupt failure. 104: Protected mode failure. 105: Last 8042 command not accepted. 107: NMI test failure. 108: Timer bus test failure. 109: Low meg-chip select test.	1. System Board

Symptom / Error	FRU / Action in Sequence
110 (Planar parity.)	<ol style="list-style-type: none"> 1. Go to "Memory Checkout" on page 122. 2. DIMM Card 3. The computer is attached to the expansion unit. 4. System Board
111 (I/O parity.)	<ol style="list-style-type: none"> 1. Go to "Memory Checkout" on page 122. 2. System Board
161 (Dead battery.)	<ol style="list-style-type: none"> 1. Go to "Checking the Backup Battery" on page 128. 2. Backup Battery 3. System Board
163 (Time and Date was not set.)	<ol style="list-style-type: none"> 1. Reseat the keyboard connector on the system board. 2. Set Time and Date. 3. System Board
173 (Configuration data was lost.)	<ol style="list-style-type: none"> 1. Reseat the keyboard connector on the system board. 2. Select OK in the error screen; then set the time and date. 3. Backup Battery 4. System Board
174 (Configuration error: Perform "Checking the Installed Devices List" on page 146 before changing any FRUs.)	<ol style="list-style-type: none"> 1. Check Device Configuration. 2. System Board 3. Diskette Drive Assembly 4. Hard Disk Drive Assembly
184 (POP check sum error.)	<ol style="list-style-type: none"> 1. Reset the POP (power-on password) in Easy-Setup.
190 (Depleted battery pack was installed when the power was on.)	<ol style="list-style-type: none"> 1. Go to "Checking the Battery Pack" on page 127.
191XX (PM initialization error.)	<ol style="list-style-type: none"> 1. System Board
195 (The configuration read from the hibernation area does not match the actual configuration.)	<ol style="list-style-type: none"> 1. Check if the configuration was changed. For example, check if the DIMM card is added.

Symptom / Error	FRU / Action in Sequence
196 (Read error occurred in the hibernation area of the HDD.)	<ol style="list-style-type: none"> 1. Run the hard disk drive test. 2. Hard Disk Drive
1XX	1. System Board
2XX 201: Memory data error. 202: Memory line error 00–15. 203: Memory line error 16–23. 205: Memory test failure on on-board memory. 221: ROM to RAM remap error.	<ol style="list-style-type: none"> 1. Go to “Memory Checkout” on page 122. 2. DIMM Card 3. System Board
301, 303, 304, 305, 3XX (301: Keyboard error.)	<ol style="list-style-type: none"> 1. Go to “Keyboard/Auxiliary Input Device Checkout” on page 123. 2. Keyboard 3. External Numeric Keypad 4. External Keyboard 5. Keyboard/Mouse Cable 6. System Board
601, 6XX (601: Diskette drive or controller error.)	<ol style="list-style-type: none"> 1. Go to “Diskette Drive Test” on page 124. 2. Diskette Drive Assembly 3. Diskette 4. System Board
602 (Diskette read error.)	<ol style="list-style-type: none"> 1. Go to “Diskette Drive Test” on page 124. 2. Diskette 3. Diskette Drive Assembly
604 (Unacceptable ID was read from the diskette drive.)	<ol style="list-style-type: none"> 1. Go to “Diskette Drive Test” on page 124. 2. Diskette Drive Assembly 3. System Board
11XX 1101: Serial_A test failure.	<ol style="list-style-type: none"> 1. Serial Device 2. Communication Cable 3. System Board
12XX 1201: Serial_B test failure.	1. System Board (Infrared)

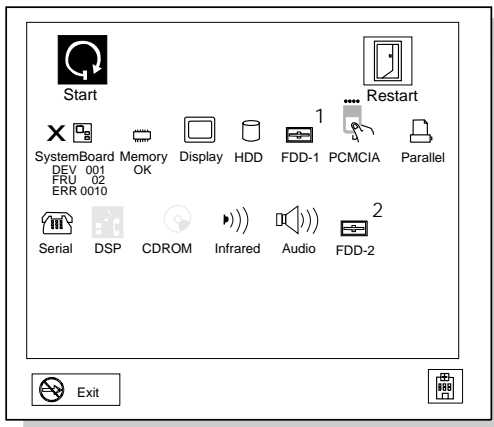
Symptom / Error	FRU / Action in Sequence
17XX 1701: Hard disk controller failure. 1780, 1790: Hard disk 0 error. 1781, 1791: Hard disk 1 error.	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. System Board
24XX (2401: System board video error.)	<ol style="list-style-type: none"> 1. System Board
808X 8081: PCMCIA presence test failure. (PCMCIA revision number also checked.) 8082: PCMCIA register test failure.	<ol style="list-style-type: none"> 1. PCMCIA Slot Assembly 2. PCMCIA Device 3. System Board
860X (Pointing device error when TrackPoint III is disabled.) 8601: System bus error—8042 mouse interface. 8602: External mouse error. 8603: System bus error or mouse error.	<ol style="list-style-type: none"> 1. External Mouse 2. External Keyboard 3. System Board
861X (Pointing device error when TrackPoint III is enabled.) 8611: System bus error—I/F between 8042 and IPDC. 8612: TrackPoint error. 8613: System board or TrackPoint error.	<ol style="list-style-type: none"> 1. Reseat the keyboard cable on the system board. 2. Keyboard 3. External Mouse 4. System Board
I9990301 I9990302 I9990305 I9990301: Hard disk error. I9990302: Invalid hard disk boot record. I9990305: No bootable device.	<ol style="list-style-type: none"> 1. Check that the operating system is installed in the HDD. If not, install the operating system. 2. Reseat the boot device. 3. Check the startup sequence for the correct boot device. 4. Check that the operating system has no failure and is installed correctly.
I9990303 (Bank-2 flash ROM check sum error.)	<ol style="list-style-type: none"> 1. System Board

Symptom / Error	FRU / Action in Sequence
Other codes not listed above	1. Go to "Undetermined Problems" on page 143.

Diagnostic Error Codes

If an error is detected, the following appears:










- Large **X** on the left side of the device icon.
- Device ID (three digit)
- Error code (two digit)
- FRU code (four digit)



The device ID and error code are used to indicate the detail portion of the FRU which caused the error. If replacing a FRU does not correct the problem, see the device ID or error code from the previous failure. If they have changed, the cause might be because the new FRU is defective or that the FRU was incorrectly installed.

Device ID: If an error is detected by the diagnostic tests, a three digits device ID is displayed. The device ID indicates suspected device.

Icon	Device ID	Suspected Device
SystemBoard	001	System Board
	003	Keyboard
	007	Math Coprocessor
	086	Pointing Device
Memory	002	Memory

Icon	Device ID	Suspected Device
 Display	050	Display
 HDD	017	Hard Disk Drive
 1 FDD-1	006	External Diskette Drive or FDD Connector of the computer
 2 FDD-2	066	External Diskette Drive or FDD Connector of the port replicator
 PCMCIA	080	PCMCIA
 Parallel	009	Parallel
 Serial	011, 012	Serial
 Infrared	103	IR
 Audio	150	Audio (ESS)

FRU Codes: If an error is detected by the diagnostic tests, a four-digit FRU code is displayed. The FRU code indicates two suspected FRUs. Replace the FRU that is indicated by the **two leftmost digits** first, then replace the FRU that indicated **two rightmost digits**. No FRU is assigned to code 00. If only one FRU is suspected, the other FRU code is filled with zeros. See the reference page before replacing the FRU.

FRU Code	FRU
10	System Board
30	Reserved
32	External Keyboard
33	External Mouse
40	LCD Assembly
45	External CRT

FRU Code	FRU
50	<ol style="list-style-type: none"> 1. Reseat the Diskette Drive (FDD-1) 2. Diskette Drive (FDD-1)
51	<ol style="list-style-type: none"> 1. Reseat the Diskette Drive (FDD-2) 2. Diskette Drive (FDD-2)
60	<ol style="list-style-type: none"> 1. Reseat the Hard Disk Drive 2. Hard Disk Drive
72	PCMCIA Slot Assembly

If the problem still remains after replacement of the FRUs, go to "Undetermined Problems" on page 143.

Beep Symptoms

Symptom / Error	FRU / Action in Sequence
Continuous beeps.	System Board
One beep and a blank, unreadable, or flashing LCD.	<ol style="list-style-type: none"> 1. Reseat the LCD connector. 2. LCD Assembly 3. System Board
One beep, and the message "Unable to access boot source."	<ol style="list-style-type: none"> 1. Boot device 2. System Board
One long, two short beeps and a blank or unreadable LCD.	<ol style="list-style-type: none"> 1. System Board 2. LCD Assembly
One long beep followed by four short beeps each time the power switch is operated. (System cannot power-on due to low battery voltage.)	Connect the AC Adapter or install a fully charged battery.
One beep every second. (System is shutting down due to low battery voltage.)	Connect the AC Adapter or install a fully charged battery (allows system to complete shutdown before changing the battery).
Two short beeps with error codes.	POST error. See "Numeric Error Codes" on page 132.
Two short beeps with blank screen.	System Board

No Beep Symptoms

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator not on, and a blank LCD during POST.	<ol style="list-style-type: none"> 1. Go to “Power Systems Checkout” on page 125. 2. System Board 3. Power sources
No beep, power-on indicator on, and a blank LCD during POST.	<ol style="list-style-type: none"> 1. System Board
No beep, power-on indicator on, and a blinking cursor only during POST.	<ol style="list-style-type: none"> 1. System Board
No beep during POST but system runs correctly.	<ol style="list-style-type: none"> 1. Turn the volume up and check the speaker. 2. Speaker 3. System Board

LCD-Related Symptoms

Important

The LCD for the notebook computer contains over 921 000 thin-film transistors (TFTs). A small number of missing, discolored, or lighted dots (on all the time) is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of dots satisfies the following condition:

The number of missing, discolored, or lighted dots in any background is 21 or more.

Symptom / Error	FRU / Action in Sequence
No beep, power-on indicator on, and a blank LCD during POST.	<ol style="list-style-type: none"> 1. System Board
LCD backlight not working, or LCD too dark, or LCD brightness cannot be adjusted, or LCD contrast cannot be adjusted.	<ol style="list-style-type: none"> 1. Reseat the LCD connectors. 2. LCD Assembly
LCD screen unreadable, or Characters missing pels, or Screen abnormal, or Wrong color displayed.	<ol style="list-style-type: none"> 1. See important note for “LCD-Related Symptoms.” 2. Reseat all LCD connectors. 3. LCD Assembly 4. System Board

Symptom / Error	FRU / Action in Sequence
LCD has extra horizontal or vertical lines displayed.	LCD Assembly

Keyboard/TrackPoint III-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Keyboard (one or more keys) does not work.	<ol style="list-style-type: none"> 1. Reseat the keyboard cable on the system board. 2. Keyboard 3. System Board
TrackPoint III does not work.	<ol style="list-style-type: none"> 1. Reseat the keyboard cable on the system board. 2. Go to "TrackPoint III Checkout" on page 124. 3. Keyboard 4. System Board
Pointer moves automatically or does not work correctly.	<ol style="list-style-type: none"> 1. See "TrackPoint III Checkout" on page 124.

Indicator-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Indicator incorrectly remains off or on, but system runs correctly.	<ol style="list-style-type: none"> 1. System Board
Battery power status indicator blinks from green, yellow, to orange.	<ol style="list-style-type: none"> 1. Check that a correct battery is installed. 2. Battery Pack 3. System Board

Power-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Power shuts down during operation.	<ol style="list-style-type: none"> 1. Go to "Power Systems Checkout" on page 125. 2. Battery Pack 3. Remove the battery pack and let it cool for two hours. 4. Power sources
The system will not power-off. (See "Power Shutdown Switch" on page 120.)	<ol style="list-style-type: none"> 1. Press the power shutdown switch. 2. System Board

Function-Related Symptoms

Symptom / Error	FRU / Action in Sequence
The system will not suspend or resume by opening or closing the LCD.	<ol style="list-style-type: none"> 1. Go to “Suspend Mode” on page 129, and check that the computer can enter suspend mode. 2. Boot an operating system and press Fn+F4. If the computer enters suspend mode, suspect that the application program is not working properly. 3. LCD Assembly 4. System Board
Battery Fuel-Gauge does not go higher than 90%.	Go to “Checking the Battery Pack” on page 127 and see the note.
Memory count (size) appears different from actual size.	Go to “Memory Checkout” on page 122.
System configuration does not match the installed devices.	Go to “Checking the Installed Devices List” on page 146.
System hangs intermittently.	Go to “Intermittent Problems” on page 142.

Peripheral-Device-Related Symptoms

Symptom / Error	FRU / Action in Sequence
External display does not work correctly.	1. See “External Display Self-Test” in “Common Devices Checkout” section.
Printer problems.	<ol style="list-style-type: none"> 1. Run Printer Self-test. 2. Parallel Port Device 3. Cable 4. System Board
Serial or parallel port device problems.	<ol style="list-style-type: none"> 1. Device 2. Device Cable 3. System Board

Infrared-Related Symptoms

Symptom / Error	FRU / Action in Sequence
Unable to communicate using the Infrared (IR) Port.	<ol style="list-style-type: none">1. Make sure the setup for the IR is correct.2. Make sure there are no fluorescent lights near the computer. The computer may receive optical noise from the fluorescent light.3. Run the advanced diagnostic test. If an error occurs and a FRU code is displayed, replace the parts shown by the FRU code.

Other Symptoms

Symptom / Error	FRU / Action in Sequence
Errors occur only when Port Replicator is used.	See "Port Replicator Checkout" on page 128.
PCMCIA slot pin is damaged.	PCMCIA Slots Assembly

Note

If you cannot find a symptom or error in this list and the problem remains, see "Undetermined Problems" on page 143.

Intermittent Problems

Intermittent system hang problems can be caused by a variety of reasons that have nothing to do with a hardware defect, such as: cosmic radiation, electrostatic discharge, or software errors. FRU replacement should only be considered when a recurring problem exists.

When analyzing the intermittent problem, do the following:

1. Run the advanced diagnostic test for the system board in loop mode at least 10 times.
2. If no error is detected, do **not** replace any FRUs.
3. If any error is detected, replace the FRU shown by the FRU code. Rerun the test to verify that no more errors exist.

Undetermined Problems

You are here because the diagnostic tests did not identify which adapter or device failed, installed devices are incorrect, a short circuit is suspected, or the system is inoperative. Follow the procedures below to isolate the failing FRU (do not isolate non-defective FRUs).

Verify that all attached devices are supported by the computer.

Verify that the power supply being used at the time of the failure is operating correctly. (See "Power Systems Checkout" on page 125.)

1. Power off the computer.
2. Check the cables, wires, and connectors for short circuits and open circuits. Visually check them for damage. If any problems are found, replace the FRU.
3. Remove or disconnect all of the following devices.
 - a. Non-IBM devices
 - b. Devices attached to the expansion bus connector
 - c. Printer, mouse, and other external devices
 - d. Battery pack
 - e. Hard disk drive
 - f. Diskette drive
 - g. DIMM card
 - h. PC Cards
4. Power on the computer.
5. Determine if the problem has changed.
6. If the problem does not occur again, reconnect the removed devices one at a time until you find the failing FRU.
7. If the problem remains, replace the following FRUs one at a time. Do not replace a non-defective FRU.
 - LCD assembly
 - System board

Related Service Procedures

This section provides information about the following:

“Status Indicators”

“How to Run the Diagnostics” on page 145

“Error Log” on page 146

“Checking the Installed Devices List” on page 146

“How to Run a Low-Level Format” on page 147

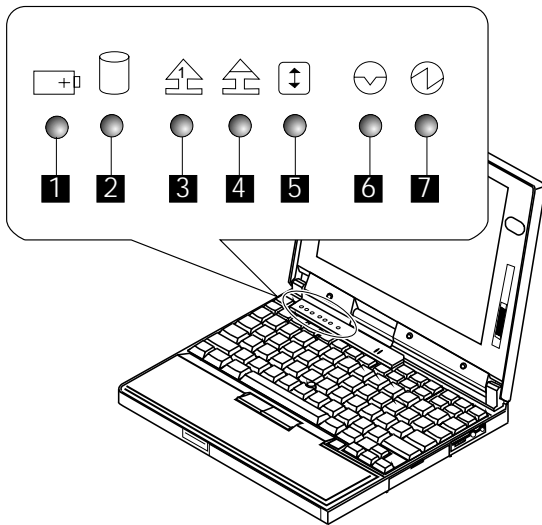
“PC Test Card LED” on page 147








“Fn Key Combinations” on page 148

“Keyboard/Auxiliary Input Device Checkout” on
page 123

Status Indicators

The system status indicators show the current computer status in different colors (green, yellow, and orange).



Symbol	Color	Meaning
1 Battery 	Green	Battery fully charged
	Orange	Battery charging
	Blinking orange	Battery needs charging
2 Hard Disk In Use 	Orange	Data is read from or written to the hard disk drive.
3 Numeric Lock 	Green	Numeric keypad on the keyboard is enabled.
4 Caps Lock 	Green	Caps lock mode is enabled.
5 Scroll Lock 	Green	Arrow keys can be used as screen-scroll function key.
6 Suspend Mode 	Green	Suspend mode
	Blinking Green	Entering suspend mode
7 Power On 	Green	Power on

How to Run the Diagnostics

Use either the TrackPoint III or the cursor move keys to interact with the tests. The Enter key works the same as selecting the OK icon to reply OK.

Note

The following tools are required:

FDD: Erasable 2HD diskette
Parallel: Wrap plug (P/N 72X8546)
Serial: Wrap plug (P/N 72X8546)
PCMCIA: PC Test Card (P/N 35G4703)

1. Press and hold the F1 key; then power on the computer. Hold the F1 key down until the Easy-Setup screen appears.
2. Select **Test** and press Enter.
3. Select a device and press Enter to run the test.
4. The test progress screen appears.
5. **OK** appears when the test ends without any errors.

6. Start the **Advanced Diagnostic test** by pressing **Ctrl+A** on the basic diagnostic menu screen.
7. Select **Tool** to install the tools.
8. Select a device, press the **Spacebar** and install the tool. Multiple devices can be selected by repeating this step.
A mark appears beside the selected devices.
9. Select **OK** and press Enter if the selection is OK.
10. Select a device and press Enter to start the tests.
11. Select **Test All** to test all devices.
12. Select **Loop Test** to run the tests in a repeated loop.
A loop option menu appears in which a device loop or all-device loop can be selected. Select a device and press the **Spacebar** to select a device. Repeat this step to select multiple devices. Press Enter to start the diagnostic loop. If no device is selected, all device tests are looped.
13. To exit the loop, keep pressing **Ctrl+Pause** until the test exits. A beep sounds to notify that the exit interrupt is sensed by the test program.

Error Log

Diagnostic errors are printed on the printer that is attached to the parallel port when the error is detected. The error is also logged in the system memory.

Do the following to display the errors.

1. End the test, if it is running.
2. Press **Ctrl+A** to select the advanced diagnostic mode.
3. Press **Ctrl+E**.
4. The error log appears.
5. To exit the screen, select the cancel icon or press Esc.

The error log is not saved when the system is powered-off.

Checking the Installed Devices List

If a device is installed but the icon appears in a gray shade rather than a dark shade on the basic diagnostics screen, the device is defective. Reseat the device connectors. If the symptom remains, replace the device or the system board. If needed, adjust the contrast control to clearly distinguish the shades of the icon.

If a device that is not installed appears in a dark shade (for example, FDD-2 appears in a dark shade when *NO* second FDD is installed), do the following:

1. Replace the **first** device in the configuration, such as an FDD-1.
2. If the problem remains, replace the system board.

The Parallel, and Serial icons are always displayed in a dark shade because the icons represent subsystems of the system board and not the attachment of the devices.

The FDD-1 icon represent the **first** drive in the system configuration for each type of device. For ThinkPad 560, FDD-1 represents an external diskette drive attached through the external diskette drive connector. Similarly, the FDD-2 icon represent the **second** drive, usually attached through a port replicator.

How to Run a Low-Level Format

Do the following to format the hard disk.

Warning: Make sure the drive address to be formatted is correct. This procedure will erase all information on the disk.

1. Power off the computer.
2. Insert the **ThinkPad hardware maintenance diskette Ver 1.20** into diskette drive **A** and power on the computer.
3. Select **Format the hard disk** from the main menu.
4. Select the drive from the menu.
5. Follow the instructions on the screen.

PC Test Card LED

The green LED on the PC test card turns on when the PCMCIA test is running. If the LED does not turn on, check that the card is installed correctly by reseating the card. If it still does not turn on after it is reseated, try using another slot for the test. If the LED still does not turn on and the test fails, replace the FRU shown by the diagnostic error code.

Fn Key Combinations

The following table shows the **Fn** key and function key combinations and their corresponding functions.

The Fn key works independently from the operating system. The operating system obtains the status through the system management interface to control the system.

Fn +	Description
F1	Reserved
F2	Fuel-Gauge display ON/OFF
F3	Standby mode invocation
F4	Suspend mode invocation
F5	Reserved
F6	Reserved
F7	LCD/CRT display switching
F8	Reserved
F9	Reserved
F10	Reserved
F11	Power management mode switching (Toggles High Power, Intelligent, Economy)
F12	Hibernation invocation

Product Overview (560)

The following table shows an overview of the system features.

Feature	Description
Processor	Intel** Pentium** 100 MHz Intel Pentium 120 MHz Intel Pentium 133 MHz
Bus Architecture	PCI Bus
Memory (Standard)	8MB (on the system board)
Memory (Option)	8MB, 16MB, 32MB DIMM card (max. 40MB)
CMOS RAM	114 Bytes
VGA Video	11.3-inch, 256 colors, 800×600 pixel DSTN color LCD 12.1-inch, 64K colors, 800×600 pixel TFT color LCD
Diskette Drive (External)	1.44MB (2-mode), 3.5-inch 1.44MB (3-mode), 3.5-inch, for Japan
Hard Disk Drive	810MB, 2.5-inch, IDE interface 1.08GB, 2.5-inch, IDE interface 2.11GB, 2.5-inch, IDE interface
I/O Port	Headphone Microphone Port replicator
Audio	16-bit Audio Internal speaker Internal microphone Mechanical volume
Infrared Transfer	IrDA** 1.0
PCMCIA	One Type-III or two Type-II

FRU Removals and Replacements

This section contains information about removals and replacements.

Do not damage any part. Only certified and trained personnel should service the computer.

The arrows in the “Removals and Replacements” section show the direction of movement to remove a FRU, or to turn a screw to release the FRU. The arrows are marked in numeric order, in square callouts, to show the correct sequence of removal.

When other FRUs must be removed before removing the failing FRU, they are listed at the top of the page.

To replace a FRU, reverse the removal procedure and follow any notes that pertain to replacement.

See “Locations” for internal cable connections and arrangement information.

When replacing a FRU, use the correct screw size as shown in the procedures.

Safety Notice 1: Translation on page 8

Before the computer is powered-on after FRU replacement, make sure all screws, springs, or other small parts, are in place and are not left loose inside the computer. Verify this by shaking the computer and listening for rattling sounds. Metallic parts or metal flakes can cause electrical short circuits.

Safety Notice 3: Translation on page 10

The battery pack contains small amounts of nickel. Do not disassemble it, throw it into fire or water, or short-circuit it. Dispose of the battery pack as required by local ordinances or regulations.

Safety Notice 8: Translation on page 14

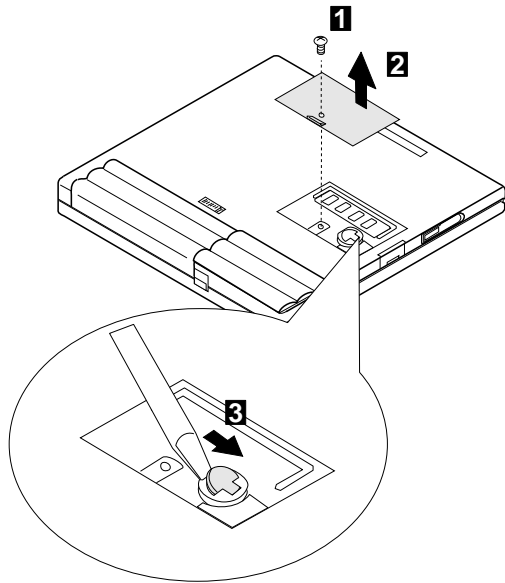
Before removing any FRU, power-off the computer, unplug all power cords from electrical outlets, remove the battery pack, and then disconnect any interconnecting cables.

1010 Backup Battery

Safety Notice 4: Translation on page 11

The lithium battery can cause a fire, explosion, or severe burn. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. Use only the battery in the appropriate parts listing. Use of an incorrect battery can result in ignition or explosion of the battery.

Turn the computer upside down.

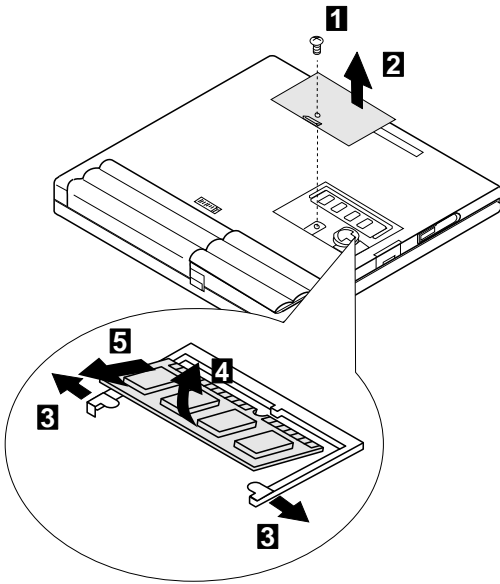


Step	Location (Quantity)	Length
1	DIMM Cover (1)	6 mm

Note: Make sure you use the correct screw.

1020 DIMM Card (If installed)

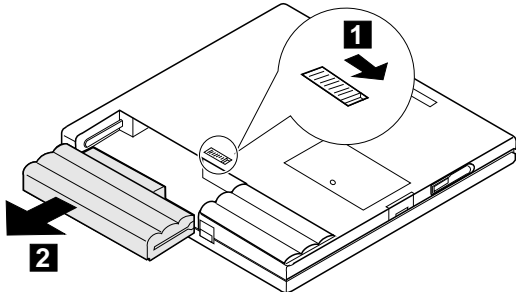
Turn the computer upside down.



Step	Location (Quantity)	Length
1	DIMM Cover (1)	6 mm
Note: Make sure you use the correct screw.		

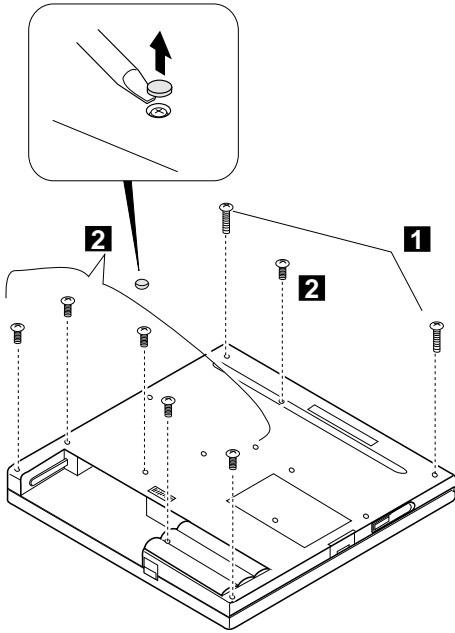
1030 Battery Pack

Turn the computer upside down.



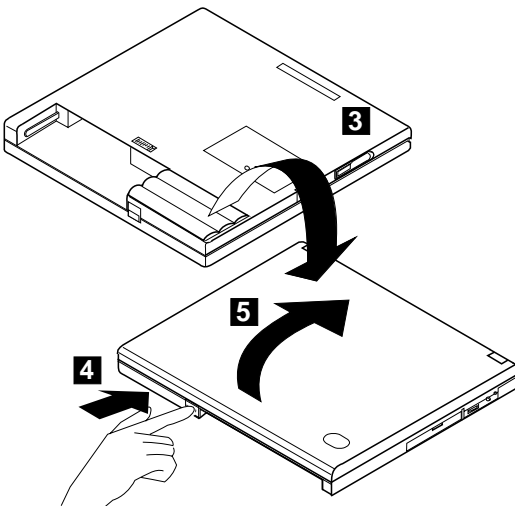
1040 Frame

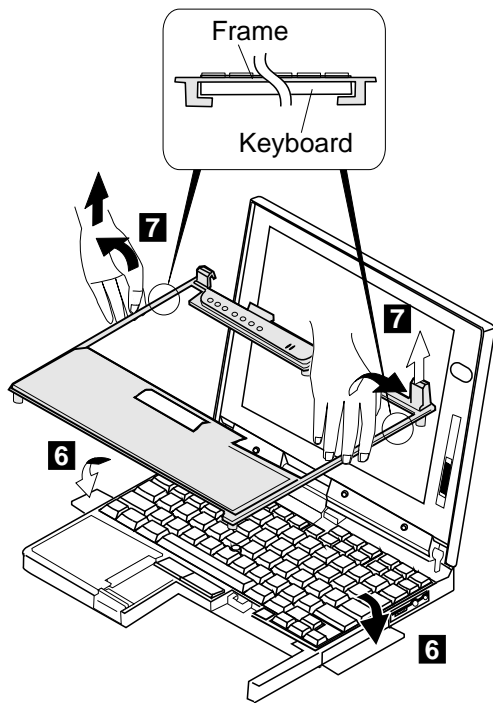
Battery Pack (1030)



Step	Location (Quantity)	Length
1	Base Cover (2)	12 mm
2	Base Cover (6)	6 mm

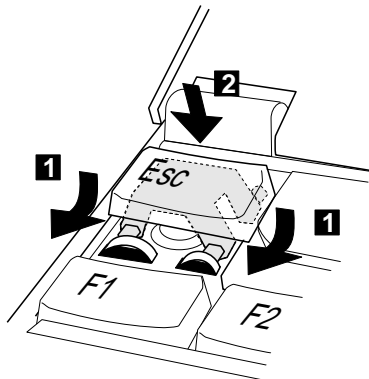
Note: Make sure you use the correct screw.





Note

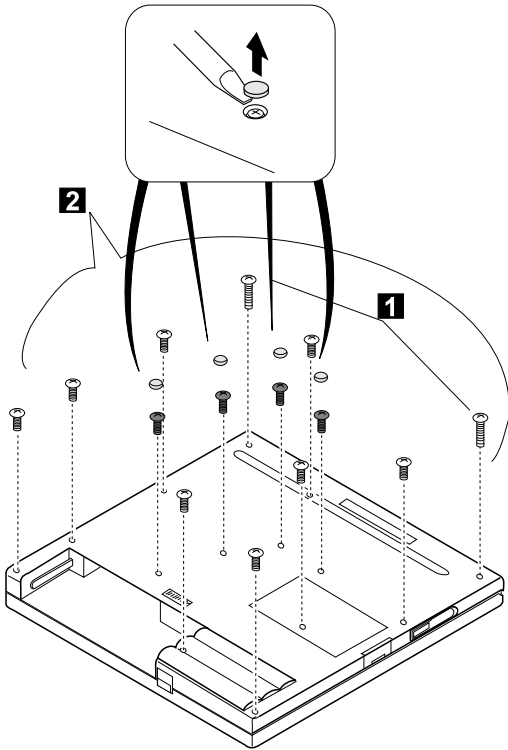
1. Be careful not to remove the **Esc** key when you remove the frame. If **Esc** key is removed, replace the key as shown.



2. When replacing the frame, check whether the click buttons of the TrackPoint III can be pressed correctly.
If the frame is not in place, the click buttons do not work.

1050 Keyboard Unit

Battery Pack (1030)



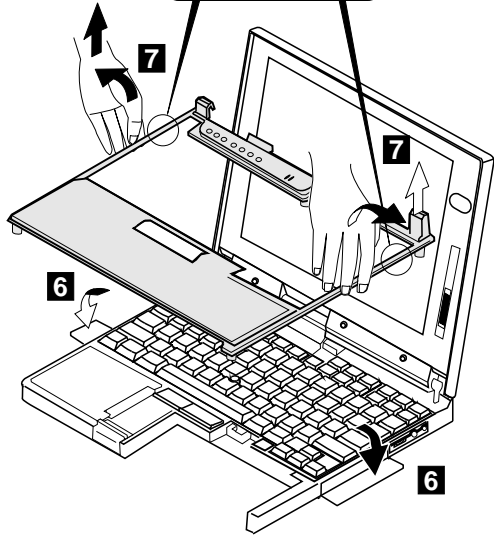
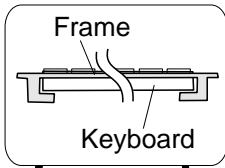
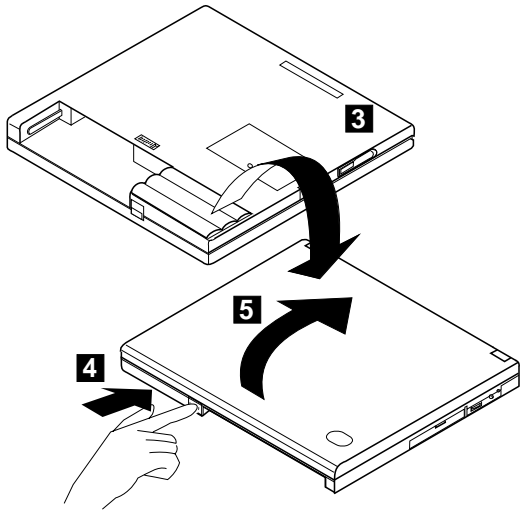
Step	Location (Quantity)	Length
1	Base Cover (2)	12 mm
2	Base Cover (12)	6 mm

Note: Make sure you use the correct screw.

Note

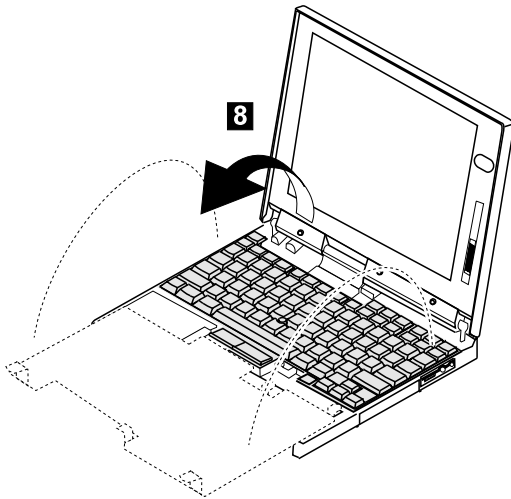
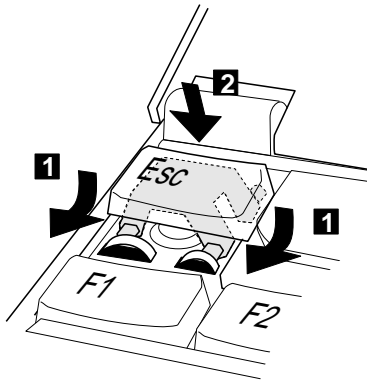
When replacing the frame, first replace the middle four screws that shown in black in the figure; then check whether the click buttons of the TrackPoint III can be pressed correctly.

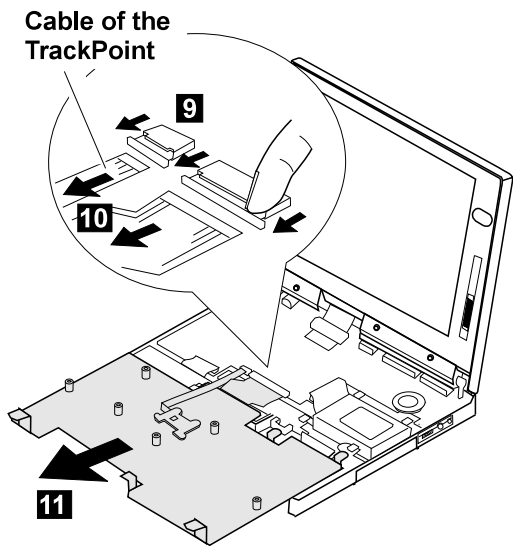
If the frame is not in place, the click buttons do not work.



Note

Be careful not to remove the **Esc** key when you remove the frame. If **Esc** key is removed, replace the key as shown.

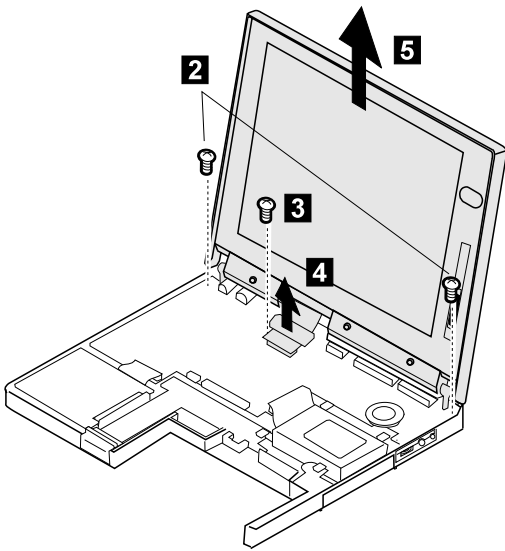
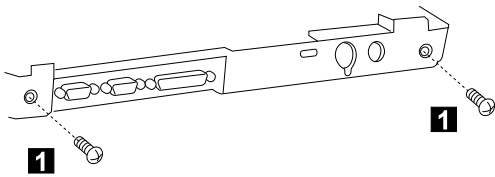




1060 LCD Assembly

Battery Pack (1030)

Keyboard Unit (1050)



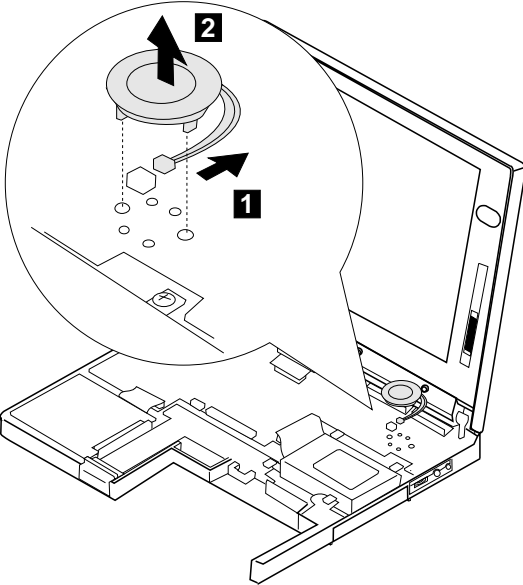
Step	Location (Quantity)	Length
1	Base Cover (2)	4 mm
2	LCD Assembly (2)	6 mm
3	LCD Cable (1)	4 mm

Note: Make sure you use the correct screw.

1070 Speaker

Battery Pack (1030)

Keyboard Unit (1050)



1080 Hard Disk Drive

Warning

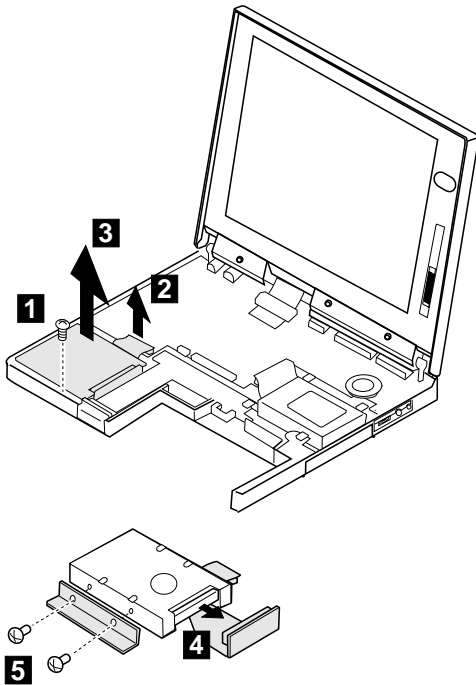
Do not drop or apply any shock to the hard disk drive. The hard disk drive is sensitive to physical shock. Incorrect handling can cause damage and permanent loss of data on the hard disk. Before removing the hard disk drive, have the user make a backup copy of all the information on the hard disk. Never remove the hard disk drive while the system is operating or is in suspend mode.

Note

Remove the hard disk drive exactly as shown in the figure. Do not apply any extra force to the hard disk drive when removing it.

Battery Pack (1030)

Keyboard Unit (1050)



Step	Location (Quantity)	Length
1	HDD Bracket (1)	6 mm
5	Hard Disk Drive (2)	3 mm

Note: Make sure you use the correct screw.

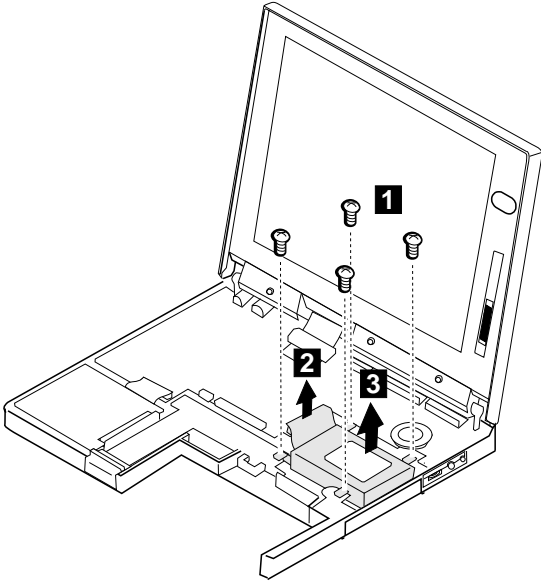
1090 PCMCIA Slot Assembly

Battery Pack (1030)

Keyboard Unit (1050)

Note

Before removing and replacing the PCMCIA slot assembly, make sure that the PCMCIA cards are removed and the eject levers are not sticking out.



Step	Location (Quantity)	Length
1	PCMCIA Slot Assembly (4)	6 mm
Note: Make sure you use the correct screw.		

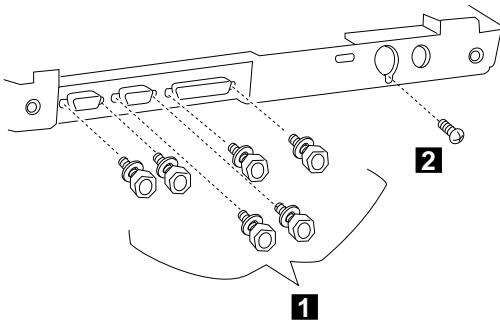
1100 System Board

DIMM Card (If installed) (1020)
Battery Pack (1030)
Keyboard Unit (1050)
LCD Assembly (1060)
Speaker (1070)
Hard Disk Drive (1080)
PCMCIA Slot Assembly (1090)

Notes

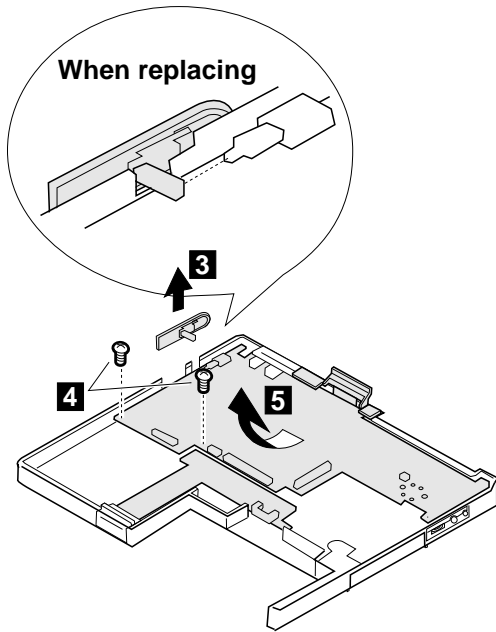
The system unit serial number must be restored when the system board is replaced. To restore the system unit serial number, select the option "Set system identification" on the maintenance diskette. The flash ROM on the system board contains the vital product data (VPD), that is, the system unit serial number, system board system number, and other computer-unique data.

Do not power off the computer when restoring the VPD. The system unit serial number label is attached to the base cover.



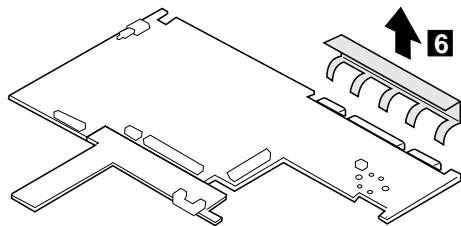
Step	Location (Quantity)	Length
1	Base Cover (6)	4 mm (Hex)
2	Base Cover (1)	3 mm

Note: Make sure you use the correct screw.



Step	Location (Quantity)	Length
4	System Board (2)	4 mm

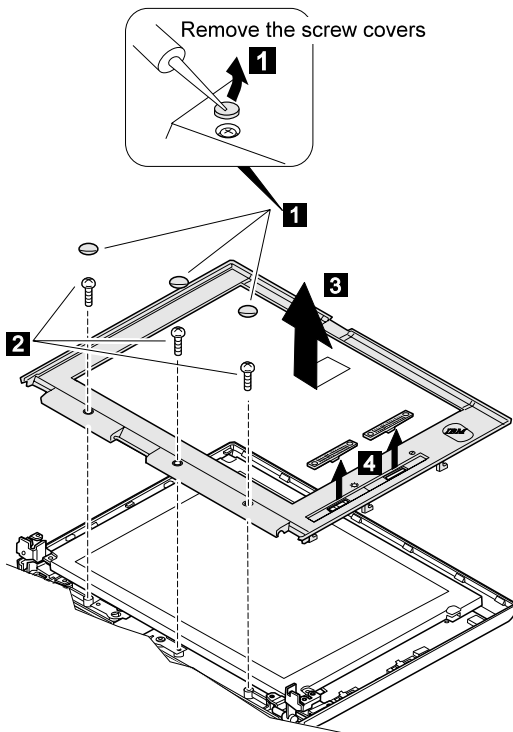
Note: Make sure you use the correct screw.



1120 LCD Front Cover

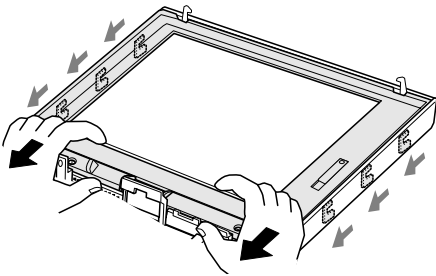
Important

The LCD for the notebook computer contains over 921,000 thin-film transistors (TFTs). A small number of missing, discolored, or constantly lighted dots is characteristic of TFT LCD technology, but excessive pixel problems can cause viewing concerns. The LCD should be replaced if the number of missing, discolored, or lighted dots in any background is 21 or more.



Notes:

1. For the TFT LCD, the slide knob is one in step 4 .
2. The LCD front cover has several latches. Release the latches as shown.

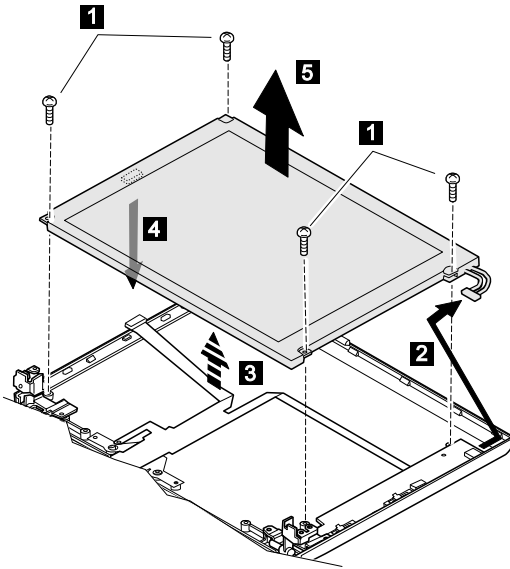


Step	Location (Quantity)	Length
2	LCD Front Cover (3)	M 2.6 x 6mm, Flat head

1130 LCD Panel

LCD Front Cover (1110)

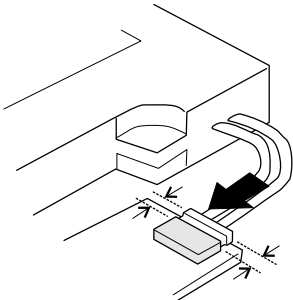
DSTN Panel



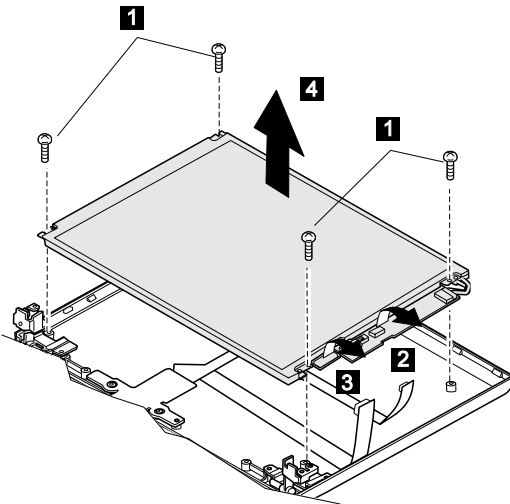
Step	Location (Quantity)	Length
1	LCD Panel (4)	M 2.5 x 6mm, Flat head

When replacing:

Connect the LCD connector to the inverter card by lining them up straight.



TFT Panel

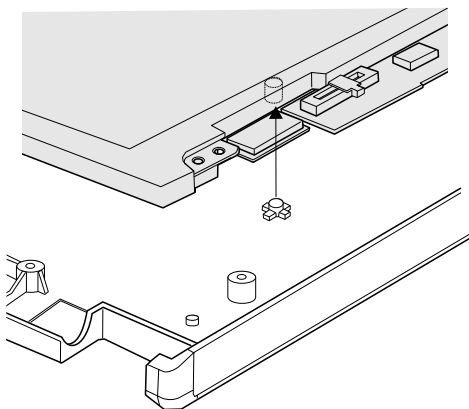


Step	Location (Quantity)	Length
1	LCD Panel (4)	M 2.5 x 6mm, Flat head

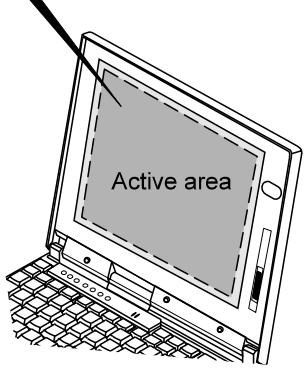
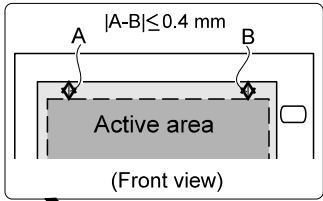
Notes:

There are two types of rear covers for the ThinkPad 560 TFT LCD unit. Make sure which type you have and follow the relevant information.

1. If there are bosses on the rear cover, put each boss into each hole of the LCD panel assembly.

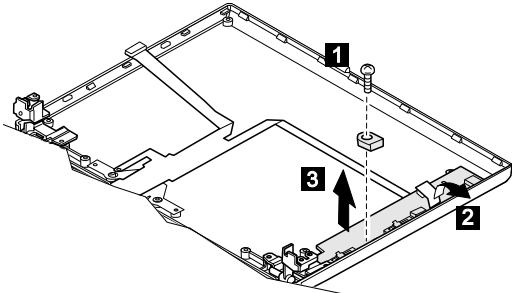


2. If there are no bosses on the rear cover, assemble the panel as shown in the following figure.



1140 Inverter Card (DSTN only)

LCD Front Cover (1120)
LCD Panel (1130)



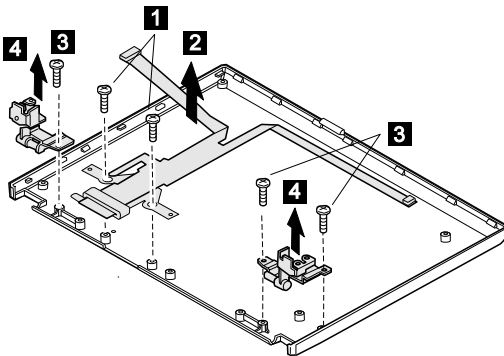
Step	Location (Quantity)	Length
1	Hinges (1)	M 2.5 x 6mm, Flat head

1150 LCD Cable / Hinges

DIMM Card (If installed) (1020)
Battery Pack (1030)
Keyboard Unit (1050)
LCD Assembly (1060) file
LCD Front Cover (1120)
LCD Panel (1130)
Inverter Card (DSTN only)(1140)

DSTN

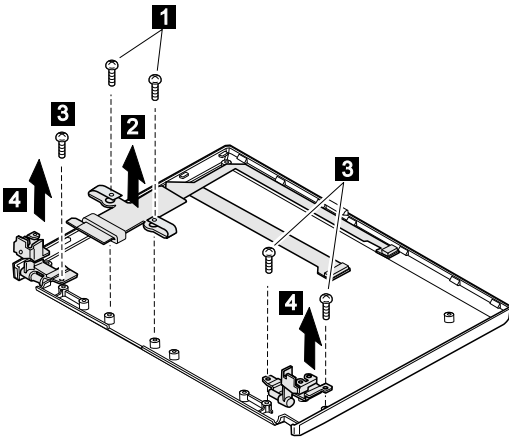
- 1 2 : LCD cable
3 4 : Hinges



Step	Location (Quantity)	Length
1	LCD Cable (2)	M 2.5 x 6mm, Flat head
3	Hinges (3)	M 2.5 x 6mm, Flat head

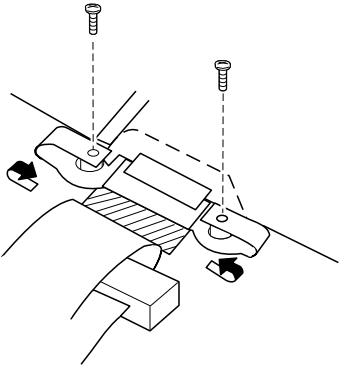
TFT

- 1 2 : LCD cable
- 3 4 : Hinges



When replacing:

See the following figure when replacing the LCD cable.

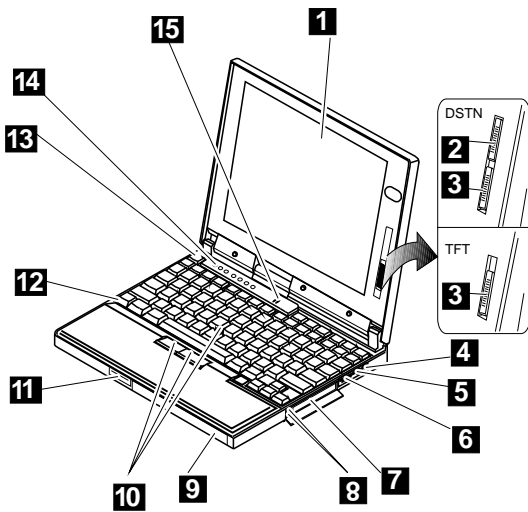


Step	Location (Quantity)	Length
1	LCD Cable (2)	M 2.5 x 6mm, Flat head
3	Hinges (3)	M 2.5 x 6mm, Flat head

Locations

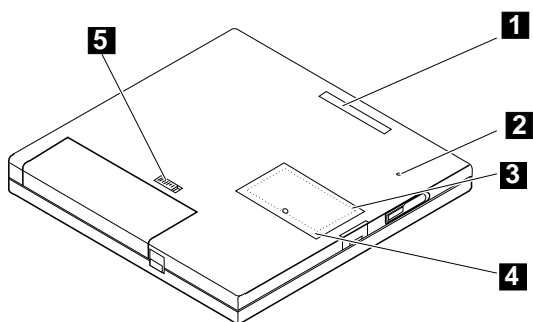
Front View

- 1 LCD
- 2 Contrast Control
- 3 Brightness Control
- 4 Headphone Jack
- 5 Microphone/Line-In Jack
- 6 Volume Control
- 7 PCMCIA Slots
- 8 PC Card Eject Buttons
- 9 Battery Pack
- 10 TrackPoint III
- 11 LCD Latch
- 12 Fn Key
- 13 Keyboard
- 14 Indicator Panel
- 15 Built-In Microphone



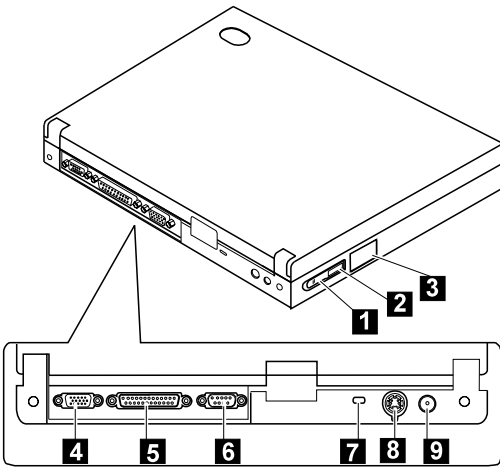
Bottom View

- 1 System-Expansion Connector
- 2 Power Shutdown Switch
- 3 Memory Slot
- 4 Memory-Slot Cover
- 5 Battery Pack Latch



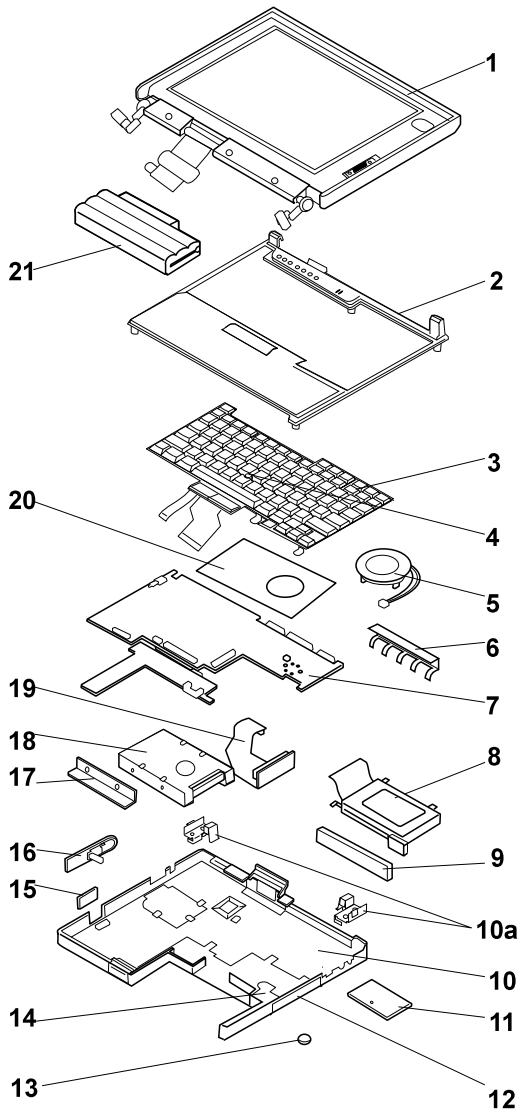
Rear View

- 1 Power Switch
- 2 IR Port
- 3 External Diskette Drive Connector
- 4 External Monitor
- 5 Parallel Connector
- 6 Serial Connector
- 7 Security Keyhole
- 8 External-Input-Device Connector
- 9 Power Jack



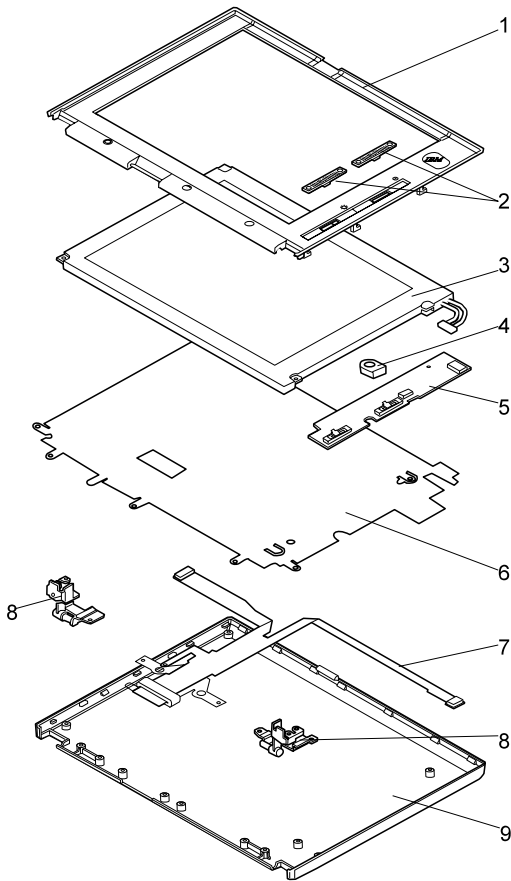
Notes

Parts Listing 560 (2640)



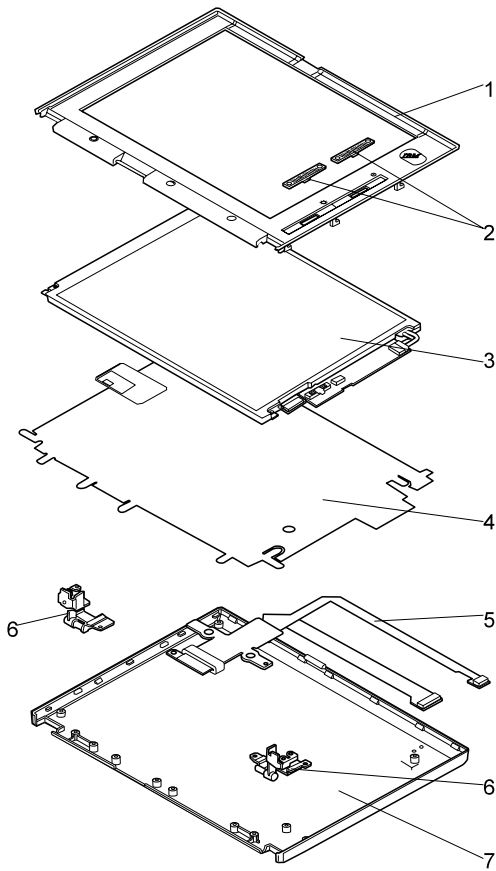
Index	System Unit	
1	LCD Assembly (11.3 DSTN)	46H4139
	LCD Assembly (12.1 TFT)	46H4140
2	Frame	46H4141
3	Keyboard (see keyboard section)	
4	TrackPoint III	84G6536
5	Speaker	46H4133
6	EMI Bracket I/O	46H4149
7	System Board (100 MHz)	46H4146
	System Board (120 MHz)	46H4147
	System Board (133 MHz)	46H4148
	For type 2640-1xx, 2640-2xx	46H3893
8	PCMCIA Slot	46H4134
9	Rubber Cap I/O	46H4151
10	Base Cover	46H4126
	For type 2640-1xx, 2640-2xx	46H4084
10a	EMI Spring	46H4145
11	DIMM Cover	46H4131
12	PCMCIA Cover	46H4127
13	Backup Battery	46H4132
14	Bracket Battery Guide	46H4135
15	FDD Connector Cover	46H4128
16	Power Switch	46H4138
17	HDD Bracket	46H4137
18	Hard Disk Drive (540 MB)	39H2219
	Hard Disk Drive (810 MB)	39H2220
	Hard Disk Drive (1.0 GB)	39H2221
	Hard Disk Drive (2.1 GB)	83H7080
19	HDD Flexible Cable	46H4136
20	Keyboard Sheet	46H4150
21	Battery Pack	46H4144
	External FDD (2-mode)	10H4056
	External FDD (3-mode)	39F2086
	External FDD Cable	39F2077
	AC Adapter Slim (2 plong)	85G6738
	AC Adapter	85G6698
	Screw Kit	46H4143
	Screw Cap	66G5046

LCD FRU (DSTN)



Index	System Unit	
1	LCD Front Cover	46H4154
2	Control Knob	46H4158
3	LCD Panel (Order LCD Assembly)	N/A
4	Spacer	46H4159
5	Inverter Card	46H4152
6	Shield Sheet	46H4157
7	LCD Cable	46H4156
8	Hinges	46H4155
9	LCD Rear Cover	46H4153
	Screw Cover	66G5046
	Screw	46H4160

LCD FRU (TFT)



Index	System Unit	
1	LCD Front Cover	46H4162
2	Control Knob	46H4224
3	LCD Panel (Order LCD Assembly)	N/A
4	Shield Sheet	46H4165
5	LCD Cable	46H4164
6	Hinges	46H4163
7	LCD Rear Cover	46H4161
	Screw Cover	66G5046
	Screw	46H3939

Keyboard

Arabic	20H4232
Belgian	20H4230
Canadian French	20H4237
Danish	20H4225
Dutch	20H4224
French	20H4222
German	20H4221
Greek	20H4235
Hebrew	20H4233
Italian	20H4223
Japanese	20H4239
Korean	20H4140
Latin Spanish	20H4236
Norwegian	20H4227
Portuguese	20H4231
Russian	20H4238
Spanish	20H4226
Swedish / Finnish	20H4229
Swiss	20H4228
Turkish	20H4234
U.K. English	20H4220
U.S. English	20H4219

Common/Option Parts List

Miscellaneous Parts

Screw Kit	46H4143
(Includes the following:)	
M2 x 3 Screw (1)	
M2.5 x 4, black (5)	
M2.5 x 6, black (19)	
M2.5 x 12, black (2)	
M3 x 3 (2)	
Hex Stud (6)	

Options

Notes:

1. When you replace the AC Adapter with a new one, use the one for the country you are in even if the computer is from different country.
2. The warranty for the system unit does not apply to all options.

Headset	85G1529
1.08 GB Hard Disk Drive Assembly	39H2221
Microphone	66G7871
PS/2 Miniature Mouse	95F5723
ThinkPad 560 Port Replicator	46H4107
DIMM 8MB	42H2767
DIMM 16MB	42H2768
DIMM 32MB	42H2769
Interface Cable to System for Keyboard	84G2531
Interface Cable to Keyboard for Keypad	84G2532
Mini-DIN to Mini-DIN Cable.	84G6474

Numeric Keypad

Belgian	95F5741
Canadian French	95F5466
Danish	95F5467
Dutch	95F5467
French	95F6313
German	95F6314
Greek	95F5467
Hebrew	95F5741
Icelandic	95F5467
Italian	95F6316
Japanese	79F6401
Norwegian	95F5467
Spanish	95F6315
Swedish / Finnish	95F5468
Swiss / French	95F5711
Swiss / German	95F5715
Turkish	95F5467
U.K. English	95F5741
U.S. English	95F5741

Black Keypad

French	84G6286
German	84G6280
Italian	84G6292
Swedish	84G6304
U.K. English	84G6298
Norway	84G6310
U.S. English	84G2530

Black Keyboard

French	84G6285
German	84G6279
Italian	84G6291
Swedish	84G6303
U.K. English	84G6297
Norway	84G6309
U.S. English	84G2529

Accessories

Keyboard/Mouse Cable	54G0444
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Tools

Tri-Connector Wrap Plug	72X8546
PC Test Card	35G4703
Audio Wrap Cable	66G5180
Screwdriver Kit	95F3598
ThinkPad Hardware Maintenance Diskette Ver 2.01 (This diskette is common for all ThinkPad models.)	78H5384

Power Cords

IBM power cords for a specific country are usually available only in that country:

For 2-pin power cords:

IBM Power Cord Part Number	Used in These Countries
13H5264	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Thailand, Trinidad (West Indies), United States of America, Venezuela
13H5267	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Macao, Malasia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, United Kingdom
13H5270	Austria, Belgium, Bulgaria, Chile, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey, former Yugoslavia
13H5273	Japan
13H5276	Argentina, Australia, New Guinea, New Zealand, Papua, Paraguay, Uruguay
13H5279	Bangladesh, Pakistan, South Africa, Sri Lanka

For 3-pin power cords:

Note

The grounded adapter is required for full MPRII compliance.

IBM Power Cord Part Number	Used in These Countries
25H2205	Argentina, Australia, New Guinea, New Zealand, Papua, Paraguay, Uruguay
25H2207	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela
25H2209	Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia
25H2211	Denmark
25H2213	Bangladesh, Pakistan, South Africa, Sri Lanka
25H2215	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, United Kingdom
25H2219	Thailand
25H2221	Switzerland
25H2223	Chile, Italy
25H2225	Israel

For 3-pin slim power cords:

IBM Power Cord P/N	Used in These Countries
76H3514	Argentina, Australia, Papua New Guinea, New Zealand, Paraguay, Uruguay
76H3516	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela
76H3518	Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Turkey, former Yugoslavia
76H3520	Denmark
76H3522	Bangladesh, Pakistan, South Africa, Sri Lanka
76H3524	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Macao, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, United Kingdom
76H3526	Japan
76H3528	Switzerland, Liechtenstein
76H3530	Chile, Italy, Ethiopia, Libia
76H3532	Israel
76H3535	Korea
76H4866	Thailand

Common Devices Checkout

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External Diskette Drive Test

Use the following procedure to isolate the diskette problem to a controller, drive or diskette. A scratch, write-enabled 2HD diskette is required.

1. Select the icon **FDD** on the **TEST MENU**. By doing this, the controller test and the drive read/write test run. If the controller test detects an error, FRU code 10 appears. In this case, replace the system board.
2. If the controller test run without errors, follow the instructions on the screen and insert a scratch diskette.
3. If the drive test detects an error, FRU code 50 appears. If the diskette media are known to be good, replace the drive or the drive cable.

External Display Self-Test

If the display problem occurs only when using an external display, use the following instructions to correct the problem.

Note

Before you replace a display, check the following list to see if it is connected correctly.

8506 and 8508 displays must be connected to an Image Adapter/A or an Image-I Adapter/A.
63XX and 85XX systems support either 63XX or 85XX displays.
85XX systems with an XGA-2 adapter support 95XX displays.
95XX systems support either 63XX, 85XX, or 95XX displays.
ThinkPad models support either 85XX or 95XX displays.

If the screen is rolling, replace the display assembly. If that does not correct the problem, replace FRUs in the following order until the problem goes away:

1. Video card
2. Display adapter (any type)
3. System board
4. Bus adapter (if used)

If the screen is not rolling, run the display self-test as follows:

1. Power-off the computer and display.
2. Disconnect the display signal cable.
3. Power-on the display.
4. Set the contrast to its maximum position.
5. Set the brightness control to the center detent position.

Check for the following conditions:

You should be able to vary the screen intensity by adjusting the contrast and brightness controls. The screen should be white or light gray, with a black margin (test margin) on the screen.

Note: The location of the test margin varies with the type of display. The test margin might be on the top, bottom, or one or both sides.

If you do not see a test margin on the screen, replace the display. If there is a test margin on the screen, replace the system board.

Note: On ThinkPad Models 700, 700C, 720C, 720C, do the following:

1. Video card
2. System board

External Keyboard/Auxiliary Input Device Checkout

The following auxiliary input devices may be available for IBM ThinkPad models.

- Numeric keypad
- Mouse (PS/2 compatible)
- External keyboard (with Keyboard/Miniature Mouse cable)

If you suspect a problem with any of the auxiliary input devices (listed above), replace the device. If the problem is not corrected, replace the following FRUs one at a time to correct the problem.

- Keyboard control card
- System board

If the computer receives an incorrect keyboard response, remove other external devices, check the keyboard connections, and recheck the keyboard responses. If the problem remains, replace the following FRUs one at a time to correct the problem.

- Keyboard
- Keyboard control card
- System board

If a 000**30100** error message appears, power-off the computer and the external devices. Then power-on the computer before you power-on the external devices.

Fax/Modem Checkout

001

- Power-off the computer.
- Ensure that the modem is installed correctly.
- If the modem never worked in customer mode, ensure that all drivers are loaded correctly onto the computer.
- Ensure that the communication program is supported on the computer.
- Ensure that the public switch telephone network (PSTN) cable and the data access arrangement (DAA) cable, if installed, are connected correctly.

If you need to correct one of the above conditions, do so now; then continue.

Note: PCMCIA cards can be inserted and removed while the system is powered on.

- Power-on the system.
- Insert the IBM Data/FAX Modem diskette into the default diskette drive.
- If you are servicing a High Speed Internal Data/Fax Modem (Models FC3632 and FC3650), at the DOS prompt (for example, A:\), type **IBMDIAG**; then press **Enter**.
- If you are servicing a PCMCIA Data/FAX Modem (Models FC3634 and FC3635), at the DOS prompt (for example, A:\), type **ESTDIAG**; then press **Enter**.
- Follow the instructions on the screen. (If you need help, press **F1**.)

DID THE DIAGNOSTIC TESTS DETECT AN ERROR?

Yes No

002

The diagnostic tests have completed successfully. If you suspect a problem, go to Step 004.

003

Go to the Symptom-to-FRU Index for the computer you are servicing.

004

- Check the PSTN cable and the DAA cable, if installed, for continuity.

IS THE CABLE(S) GOOD?

Yes No

005

Replace the defective cable(s).

006

(Step 006 continues)

006 (continued)

- Have the customer transmit a call.

WAS THE CALL TRANSMITTED SUCCESSFULLY?

Yes No

007

Go to Step 011.

008

- Have the customer receive an incoming call on the modem.

WAS THE INCOMING CALL RECEIVED?

Yes No

009

Go to Step 014.

010

The diagnostic tests have completed successfully. If you still suspect a problem that is not software related, replace the External DAA; then replace the modem.

011

- Have the customer transmit a call at a lower speed.

WAS THE CALL TRANSMITTED SUCCESSFULLY?

Yes No

012

If installed, replace the external DAA. If you do not have an external DAA installed, or replacing the external DAA does not correct the problem, replace the modem.

013

Have the telephone line checked.

014

- Have the customer receive an incoming call on the modem at a lower speed.

WAS THE INCOMING CALL RECEIVED?

Yes No

015

If installed, replace the external DAA. If you do not have an external DAA installed, or replacing the external DAA does not correct the problem, replace the modem.

(CONTINUED)

016

Have the telephone line checked.

Printer Checkout

1. Make sure the printer is correctly connected and is powered-on.
2. Run the printer self-test.

If the printer self-test does not run correctly, the problem is in the printer. Refer to the printer service manual.

If the printer self-test runs correctly, do the following.

1. Verify the port settings in configuration.
2. Install a wrap plug on the port (indicated in configuration) and run the advanced diagnostic tests.
3. If the advanced diagnostic tests (with the wrap plug installed) do not detect a failure, replace the printer cable.

If the problem is not corrected, replace the system board.

Port Replicator Checkout

Use the following procedure to isolate a port replicator problem. A port replicator attaches to the system expansion connector at the rear of the computer.

1. Power-off the computer.
2. Remove the failing devices from the replicator.
3. Unplug the AC adapter from the replicator, if attached.
4. Remove the port replicator from the computer.
5. Reconnect the failing device directly to the computer. (If another device occupies the connector, remove it first.)
6. Go to General Checkout and follow that procedure.
7. If the advanced diagnostic device test does not find an error, suspect a problem with the port replicator or the system expansion bus.
8. Power-off the computer and reconnect the port replicator.
9. Power-on the computer and run the following advanced diagnostic tests:
 - Serial port test with the wrap plug installed on the replicator.
 - Parallel port test with the wrap plug installed on the replicator.
 - PCMCIA-2 test with the PC test card installed.
 - FDD-2 (FDD-1 if no drive is installed in the computer) drive test on the failing device.
10. If diagnostic errors appear, replace the replicator or diskette drive attachment unit.
 - If the problem remains after the replacement, replace the system board.
11. If power problems appear only when using the replicator, replace the replicator.

If power shut downs occur intermittently when using PCMCIA-2 devices via a port replicator, suspect an over-current problem. Some PCMCIA devices use more power; if the maximum usage of each device occurs simultaneously, the total current will exceed the limit, thereby causing a power shut down. Isolate this problem by removing one of the devices, and use the computer under the same condition, and see whether a power shut down occurs. Do this procedure for all devices then determine the cause. Customer purchase of the larger AC adapter (50W, optional) is recommended, if it is not yet in use.

TrackPoint Checkout

If the TrackPoint does not work, check the configuration. If the configuration of the TrackPoint is set to **Disabled** or **Off**, change it to **Enable** or **On**.

If the problem remains, continue.

Note: TrackPoint automatically compensates to adjust the pointer sensor. This causes the pointer to move slightly on the screen and then stop. Pointer movement might occur when a slight, steady pressure is applied to the TrackPoint pointer when the computer is powered-on or running, or when exceeded temperature range requires re-adjustment.

If the cursor floats or moves erratically, power-off and disconnect the mouse. Power-on the computer. If the problem goes away, replace the mouse. If the problem remains, replace the keyboard.

For click button or pointing stick problems:

1. Go to the Easy-Setup screen.
2. Select an item with the pointing stick.
3. Press either left or right click button.
4. Verify that both buttons work correctly.

If the pointing stick or the click button does not work, do the following.

1. Reseat the keyboard cables.
2. Replace the keyboard.
3. Replace the interposer card (355x, 360x, 750x, 755x).
4. Replace keyboard control card (720).
5. Replace the system board.

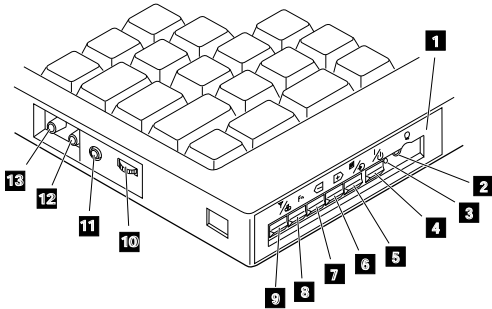
TV Tuner





The TV Tuner Pack (hereafter called TV Tuner) is an option for watching TV programs or videos on the IBM TFT color notebook computer. The computer changes to TV reception when the removable diskette drive is replaced with the TV Tuner.








The TV screen and normal computer display are easily switched by using the Hot key on the front panel of the TV Tuner.

Identifying Names and Functions

The following figure and table show the names and functions of each part of the TV Tuner.






Icons	Functions
1 Front Panel	Used to change the TV channels, switch TV mode to computer mode, and operate most functions of the TV Tuner.
2 Headphone Jack 	Connects the headphones.
3 Power Indicator	Shows the TV Tuner is powered on.
4 Power Switch 	Powered on and off the TV Tuner.
5 Hot Key 	Switches between the TV screen and computer screen.
6 Up Switch 	Increases the value such as the channel number.

Icons	Functions
7 Down Switch 	Decreases the value such as the channel number.
8 Function Key Fn 	Enters the mode to change the value of each function, such as TV channel or color contrast. (See "Using the Function Key" on page 199.)
9 TV/EXT Switch 	Switches the TV mode or external video mode.
1 Volume Knob 	Controls the speaker volume.
11 Audio-In Jack 	Connects the audio-in connector of the AV cable.
12 Video-In Jack 	Connects video-in connector of the AV cable.
13 RF Connector 	Connects the active antenna unit or antenna cable.

Using the Front Panel

The following table shows how to operate all functions of the TV Tuner with the controls on the front panel.

Key	Function
Power 	Turns on the TV Tuner. This key is used only when the computer is turned on.
Hot Key 	Switches computer display and TV screen.
Up 	Increases the value of parameters, Channel Number, Color, Tint, Brightness, Contrast, Auto Tuning Sensitivity, On-screen Message Selection.

Key	Function
Down ⏪	Decreases the value of parameters, Channel Number, Color, Tint, Brightness, Contrast, Auto Tuning Sensitivity, On-screen Message Selection.
Function Fn	Selects a function mode to adjust each function parameter. (See "Using the Function Key" on page 199.)
TV/Ext TV/Ext	Switches the displayed video source between the receiving TV broadcast program and external devices such as VCR, video camera recorder, laser disk, and so on.

Using the Function Key: Each time you press the Function key (Fn), one of the following messages (called *On-Screen Message*) appears at the top left corner of the LCD.

The changed values are automatically saved when you return to the "TV Channel" On-Screen message. The values are not saved when you power-off the TV Tuner without returning to this message.

Message on LCD	Parameter
_____ (xx)	TV Channel By using ⏪ and ⏩, you can select the channels from 2 to 69.
_____ COL	Color Adjustment By pressing and holding ⏪ or ⏩, you can change the color.
_____ TNT	TINT Adjustment By pressing and holding ⏪ or ⏩, you can change the tint.

Message on LCD	Parameter
<hr/> BRT	Bright Adjustment By pressing and holding \leftarrow or \rightarrow , you can change the brightness.
<hr/> CNT	Contrast Adjustment By pressing and holding \leftarrow or \rightarrow , you can change the contrast.
<hr/> ---	(No function) Reserved.
<hr/> LO <hr/> HI	Auto Tune Sensitivity Selection LO: Means the sensitivity of the TV is low. In this mode, the TV Tuner receives strong TV signals only. To set LO, press \leftarrow . HI: Means the sensitivity of the TV is high (factory default). In this mode, the TV Tuner receives weak and strong TV signals. To set HI, press \rightarrow .
<hr/> D3S <hr/> DON	Time On-Screen Message appears D3S: On-Screen Message appears for 3 seconds. To set D3S, press \leftarrow . DON: On-Screen Message always appears. To set DON press \rightarrow

Power-on the TV Tuner: Use the ThinkPad Features program or PS2.EXE. to power-on the TV Tuner; then power-on the internal device in the diskette drive compartment. If power for the internal device is turned off when the TV Tuner is set up, nothing appears on the LCD display. Turn on power for the TV Tuner again.

If you are using DOS, do one of the following:

- Power-on the computer and type PS2 from the command prompt to start the ThinkPad Features program.

Select **Set Power Features** from the ThinkPad Features menu; then put a check mark at **Internal Serial Port** (or **Diskette Drive Compartment**) under the **Power for devices**. If you need help, press **F1** to display the help menu.


- Type PS2 MODEM ON (or PS2 DDC ON) from the command prompt; press the Enter key to set the power ON.

If you are using OS/2* or Microsoft Windows**, do the following:

1. Power-on the computer and start the ThinkPad Features program.
2. Select the **Power** icon; then move the pointer to **Internal Serial Port** (or **Diskette Drive Compartment**) under the **Power for devices** and click the button to check mark it.
3. Press the **OK** button.

Troubleshooting

The following table shows what to do to solve problems when the TV Tuner does not work correctly.

Problem	Probable Cause
The TV Tuner does not operate. (No picture or sound)	<p>Computer is not powered on.</p> <p>Computer is in suspend mode.</p> <p>Volume control of the TV Tuner or computer is not adjusted correctly.</p> <p>The power for the TV Tuner is not supplied. (See "Power-on the TV Tuner" on page 201.)</p> <p>The wall outlet from the outdoor antenna is not active.</p> <p>The video or antenna cable is not connected correctly.</p> <p>Antenna elements of the active antenna unit are not adjusted.</p> <p>The batteries in the active antenna unit are not inserted correctly.</p> <p>The batteries in the active antenna unit are depleted.</p> <p>The TV Tuner is not set up correctly.</p> <p>You cannot watch TV or videos on the external display.</p> <p>LO is set for the auto tune sensitivity selection. (See page 199.)</p>
No color.	The program is not in color.
Snow and noise only.	Switch the TV/EXT () button.
Pictures are out of shape, or have double images.	<p>For TV:</p> <p>The channel is not tuned correctly. Adjust the antenna.</p> <p>For VCR:</p> <p>Change the tracking adjustment.</p>
Dotted lines or stripes.	Usually caused by interference from neon signs, hair dryers, and so on. Move the computer to avoid the interference.
Picture control are not saved.	Do not power-off the TV Tuner when adjusting functions such as picture control, color, tint, brightness, or contrast.
Channel number is always displayed or is not displayed.	Select your favorite mode for the on-screen message. (See page 199.)

Miscellaneous Information

Acronyms, Abbreviations and Terms

Term	Information
ACPA/A	Audio Capture and Playback Adapter
ADP	Automatic Data Processing
Alt	Alternate
ANSI	American National Standards Institute
ARTIC	A Real Time Interface Coprocessor
ASCII	American National Standard Code for Interface Interchange
AT	Advanced Technology (as in AT Bus)
AVC	Audio Video Connection
BIOS	Basic Input/Output System (Controls System Resources)
bps	Bits Per Second
BPS	Bytes Per Second
CCITT	The International Telephone and Telegraph Consultative Committee
CCS	Common Command Set
CCSB	Common Complete Status Block
CCSB	Configuration Control Sub Board
CD	Compact Disc
CDPD	Cellular Digital Packet Data
CD-ROM	CD Read Only Memory (stores data/audio)
CE	Customer Engineer or Service Representative
CRC	Cyclic Redundancy Check
CRT	Cathode Ray Tube
CSD	Corrective Service Diskette
CGA	Color Graphics Adapter (See EGA, VGA, XGA)
CRC	Cyclic Redundancy Check
CRT	Cathode Ray Tube
CSA	Canadian Standards Association
CSD	Corrective Service Diskette
DASD	Direct Access Storage Device (hard disk, diskette)
DMA	Direct Memory Access
DRAM	Dynamic Random Access Memory
DSTN	Double Super Twisted Nematic
ECA	Engineering Change Announcement
ECC	Error Correction Code
EGA	Enhanced Graphics Adapter
ESD	Electrostatic Discharge
ESDI	Enhanced Small Device Interface
EEPROM	Electrically Erasable Programmable Read Only Memory
EWS	Energy Work Station
FDD	Floppy Disk Drive
FRU	Field Replaceable Unit (replaceable part)
GPIB	General Purpose Interface Bus (IEEE 348)
GSA	General Services Administration
HDD	Hard Disk Drive
Ht	Height
IDE	Integrated Drive Electronics
IC	Integrated Circuit
IEEE	Institute of Electrical and Electronics Engineers
IEC	International Electrotechnical Commission
IML	Initial Machine Load

Term	Information
IPL	Initial Program Load
IR	Infrared
ISO	International Organization for Standardization
ISDN	Integrated-Services Digital Network
LAN	Local Area Network
LBA	Local Block Address
LTB	Local Transfer Bus
LUN	Logical Unit Number (as in SCSI)
MAP	Maintenance Analysis Procedure
MCGA	Modified Color Graphics Adapter (320 x 200 x 256)
MCA	Micro Channel Architecture (bus structure)
MHz	Mega hertz (millions of cycles per second)
MIDI	Musical Instrument Digital Interface
MM	Multimedia
N/A	Not Available or Not Applicable
NMI	Non-Maskable Interrupt
NSC	National Support Center
NVRAM	Non Volatile Random Access Memory
OEM	Original Equipment Manufacturer
PCMCIA	Personal Computer Memory Card International Association
POS	Programmable Option Select
PUN	Physical Unit Number (as in SCSI)
RAID	Redundant Array of Inexpensive Disks (disk array models)
RAM	Random Access Memory (read/write)
RGB	Red Green Blue (is in monitors)
RIPL	Remote Initial Program Load
ROM	Read Only Memory
SASD	Sequential Access Storage Device (Tape)
SCB	Subsystem Control Block
SCSI	Small Computer Systems Interface
SCSI ID	SCSI Identification Number (assigned device number)
SPD	Software Product Description
SR	Service Representative
SRAM	Static Random Access Memory
SVGA	Super Video Graphics Array
STN	Super Twisted Nematic
T/A	NDD Technical Advisor (See your Marketing Representative)
TDD	Telecommunications Device for the Deaf
TFT	Thin-Film Transistor
TPF	ThinkPad File
UL	Underwriters Laboratory
VCA	Video Capture Adapter
VESA	Video Electronics Standards Association
VGA	Video Graphics Array (640x480x16)
VPD	Vital Product Data
VRAM	Video Random Access Memory
WORM	Write Once, Read Many Media
XGA	Extended Graphics Array (1024 x 768 x 256)
Y/C	Luminance/Chrominance Signal (Pertains to Video)

Send Us Your Comments!

We want to know your opinion about this manual (part number 84H8101). Your input will help us to improve our publications.

Please photocopy this survey, complete it, and then fax it to **IBM HMM Survey at 919-543-8167 (USA)**.

Name _____

Phone Number _____

1. Do you like this manual?

Yes No

2. What would you like to see added, changed, or deleted in this manual?

3. What is your service experience level?

Less than five years

More than five years

4. Which ThinkPad systems do you service most?

Thanks in advance for your response!

Do You Need Technical References?

We have a wide range of hardware technical references that provide in-depth information about IBM personal computer products. Our Technical Reference Library includes information about:

- Micro Channel, Setup, and Subsystem Control Block architectures

- Common interfaces (including microprocessors, system timers, parallel and serial port controllers, keyboards and keystrokes, SCSI, DMA, video, and more)

- Specific Personal System/2 systems (including system board connectors, jumpers, memory subsystems, I/O subsystems, programming interfaces and registers, and error codes)

- Basic input/output system (BIOS)

- Options and adapters

Important

A catalog of our current offerings is available on the World Wide Web at:

<http://www.pc.ibm.com/desktop/pcdcat.html>

Technical information manuals for the latest Commercial Desktop computers are available on the World Wide Web. These publications can be viewed online in BookManager format, or they can be downloaded as PostScript files.

Go to <http://www.pc.ibm.com/cdt>

and then select the "Technical information" topic.

Problem Determination Tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

Machine type and model

Processor or hard disk upgrades

Failure symptom

- Do diagnostics fail?
- What, when, where, single, or multiple systems?
- Is the failure repeatable?
- Has this configuration ever worked?
- If it has been working, what changes were made prior to it failing?
- Is this the original reported failure?

Diagnostics Diskette Version

- Type and revision level

Hardware configuration

- Print out (print screen) configuration from Reference Diskette currently in use
- BIOS level

Operating system software

- Type and revision level

Important

To eliminate confusion, identical systems are considered *identical* only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between "working and non-working" systems will often lead to problem resolution.

Authorized Dealers or Servicers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-528-7705	Bulletin Board Service - TSS Only
800-937-3737	IBM Business Partner Education
800-426-2472	IBM Customer Engineer Technical Support
800-IBM-DEAL	IBM Dealer Support Center
800-342-6672	IBM Direct Desktop Software Sales
303-924-4015	IBM Part Number ID and Look Up
800-426-7763	IBM PC HelpCenter
800-237-5511	IBM Software Defect Support (CSDs)
800-327-5711	IBM Software Ordering (Publications)
800-426-1484	IBM Supplies Technical Hotline
800-388-7080	IBM Warranty Parts Claims Center

U.S. Customers and Helpware Subscribers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-426-8322	Customer Education Business Unit
800-999-0052	Customized Operational Services
800-237-4824	EduQuest (Educational Computers)
800-964-8523	End User HelpDesk Support
800-742-2493	IBM Anti-Virus Services
800-447-4700	IBM Authorized Dealer Referrals
800-426-2468	IBM Dealer Referral
800-426-3333	IBM Information Referral Service
800-IBM-SERV	IBM Service
800-772-2227	IBM PC HelpCenter and HelpDesk
800-426-7282	IBM Technical Manuals
800-426-9402 (Ext. 150)	Multimedia Information Center
800-241-1620	Multimedia HelpCenter
800-342-6672	OS/2 Information Line
800-237-5511	OS/2 Support Services
800-284-5933	Prodigy
914-962-0310	Prodigy User Questions
800-547-1283	Technical Coordinator Program
	SystemXtra for Personal Systems
	LAN Automated Distribution/2
	OS/2 Bulletin Board
	OS/2 Application Assistance Center
800-551-2832	Technical Solutions Magazine

IBM Canada Customer and Servicer Support

Number	Information
800-661-PSMT	Business Partner Marketing Support
905-316-5556	Business Partner Marketing Support - Toronto
514-938-6048	Business Partner Marketing Support - French
800-465-4YOU	Customer Relations
800-IBM-SERV	Customer Service Dispatch
800-263-2769	Customer Service Parts
800-465-2222	Customer Support Center (ISC)
416-443-5701	Customer Service Repair Centre
800-505-1855	Dealer Support Group (DSG)
800-465-7999	HelpClub Registration / IBM Direct
800-465-3299	HelpFax
905-316-3299	HelpFax - Toronto
800-565-3344	HelpPC
905-513-3355	IBM Certification Administrator Mail to: 50 Acadia Drive Markham, Ontario L3R 0B3
800-661-2131	IBM Education (A+ Course)
800-268-3100	IBM Information Network Support
800-387-8343	IBM PC Service Partners
800-487-7426	International Warranty Registration
800-663-7662	Lexmark Product Information
800-IBM-9990	PartnerLine
800-263-2769	Parts Orders, Exchange or Emergency
416-443-5808	Parts Regular Orders, Exchange (Fax)
416-443-5755	Parts Orders, Inquiries
514-938-3022	PC Co Bulletin Board - Montreal
905-316-4255	PC Co Bulletin Board - Markham
604-664-6464	PC Co Bulletin Board - Vancouver
204-934-2735	PC Co Bulletin Board - Winnipeg
800-661-7768	PS Marketing Support (PSMT)
800-565-3344	PS/1 Warranty Customer Helpline
800-387-8483	PS/1 Warranty Service (DOAs)
800-465-1234	Publications Ordering
905-316-4148	Service Management Support
905-316-4100	Service Management Support (Fax)
905-316-4150	Service (Warranty) Manager
905-316-4100	Service (Warranty) Manager (Fax)
905-316-4872	Service Quality Programs
905-316-4100	Service Quality Programs (Fax)
800-661-2131	Skill Dynamics (Education)
800-565-3344	ThinkPad EasyServe
416-443-5835	Warranty Claim Fulfillment (Fax)
905-316-2445	Warranty Claim Reimbursement
905-316-3515	Warranty Claim Reimbursement (Fax)
416-443-5778	Warranty Claim Parts Inquiry
800-505-1855	Warranty Provider Support Hotline
800-267-7472	Warranty Service, ThinkPad

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